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SCIENCE

BLUE JAY

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Editor: Sheila Lamont.

Associate Editors: Margaret Belcher, J. Bernard Gollop, Wayne C. Harris, Ronald Hooper, George F. Ledingham, Robert W. Nero, Carol A. Scott.

Editorial Assistant: Carman Dodge

Circulation: Ron Jensen.

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Cover: *Female Great Gray Owl with vole for young* *Robert R. Taylor.*

BLUE JAY

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THE GREAT GRAY OWL IN MANITOBA, 1968-83

ROBERT W. NERO, Wildlife Branch, Box 14, 1495 St. James Street, Winnipeg, Manitoba, R3H 0W9, HERBERT W.R. COPLAND, Manitoba Museum of Man and Nature, 190 Rupert Avenue, Winnipeg, Manitoba, R3B 0N2 and JOSEPH MEZIBROSKI, 26 Pearce Avenue, Winnipeg, Manitoba, R2V 2K4.

Most owls hunt mainly at night, but the Great Gray Owl is an exception. In winter, especially, this species may hunt all day long. Bold and large, and frequently perched in leafless deciduous trees, they are notably conspicuous. These owls attract much attention when they wander far outside of their usual breeding range and into settled areas, but they also may be seen in winter within their breeding range. In recent years, looking for Great Gray Owls has become an annual winter pastime in suitable areas of southern Manitoba. This report reviews the seasonal sightings of this species in this region for the 15 years from 1968 through 1983, but breeding information for this period is also briefly presented.

Special attention was drawn to the Great Gray Owl in Manitoba late in 1964 when visiting ornithologist David F. Parmelee submitted a nest record card to the Prairie Nest Records Scheme. This nest was discovered near Phil Reader's home 16 km (10 mi.) north of The Pas, and was only the second one known for the province.[15] In 1968, Reader found Great Gray Owls using the same nest. Nero and Robert R. Taylor drove about 800 km (500 mi.) from Winnipeg to observe and photograph these owls.[8] This provided Taylor's first photographs of Great Gray Owls, a quest which he has pursued ever since. The following winter (1968-69), as if by magic, larger numbers of Great Gray Owls were observed in southern Manitoba than had previously been recorded. That winter, Copland, Nero and Taylor trapped and banded Great Gray Owls for the first time. During the same period, hundreds of Manitobans had their first look at this magnificent bird. Subsequently, the provincial status of this species was reviewed in some detail; all known records (including nests) were reported.[7] A few records which had been overlooked and records for winter 1969-70 were published the following year.[9] In spring 1970, considerable interest was stimulated by the discovery of an active nest about 5 km (3 mi.) south of South Junction, Manitoba, just across the border in Minnesota and less than 160 km (100 mi.) southeast of Winnipeg.[6] [10]

Nero with adult male Great Gray Owl
Robert R. Taylor

Thereafter, a concerted effort was made to learn more about the occurrence of this species in the region. For a few years in spring and summer, aided by Bob Taylor and Spencer G. Sealy, efforts were made to find active nests. A man-made nest, built in July 1970 to attract Great Gray Owls, was used by a pair in 1974.[14] Now more than 100 nest structures have been installed. This endeavour was carried out mainly by Copland and Nero (and members of the Nero family), and notably by Raymond Tuokko.[11] Accounts of more than 50 active natural and man-made nests recorded since 1970 (Map 3) will hopefully be given at a later time. From 1975-77, K. Michael Collins, working under Spencer Sealy, studied owls at two successful nests about 83 km (50 mi.) east of Winnipeg, and one aborted nesting south of South Junction, producing a thesis for a master's degree at the University of Manitoba.[1]

By about 1975, it had become clear that the Great Gray Owl, in addition to being resident over much of the mixed woods and coniferous forest regions of the province, was a not uncommon breeding species in extreme southeastern Manitoba and adjacent Minnesota. Much information on the habits and occurrence of the Great Gray Owl in this region was brought together in a comprehensive book, authored by Nero and copiously illustrated by Bob Taylor, published in 1980.[12] Copland and Nero have continued to work as a team, driving more than 10,000 km some winters to capture and band owls, and banding owls at nests. No one could have guessed, in 1968, that by spring 1984 more than 450 Great Gray Owls (about 100 young and 350 grown birds) would have been banded in this region (Table 1).

Female with young in a man-made nest in a tamarack bog *Robert R. Taylor*

Methods

Since 1968, Nero has been compiling observations of Great Grays for Manitoba (records from No. 310 highway for 5 km (3 mi.) south of the border south of South Junction, Manitoba, are included in this report). To obtain records, extensive publicity was undertaken, including lectures, radio and TV broadcasts, newspaper articles, distribution of illustrated posters, publication of articles and hundreds of phone calls. Many records were obtained from the public, from staff of the Department of Natural Resources, and other government employees. Canadian and U.S. customs and immigration officials at the ports of Middlebro and especially South Junction also provided information.

Observations were requested throughout the province, but Copland and Nero mostly worked in areas where birds were being observed and reported. In late winter 1979, for example, they banded 21 owls in the northern Interlake region. One winter they drove to The Pas, and in two summers they drove to Bissett and Wabowden to band birds at nests. In order to band as many owls as possible, it was to known sites that efforts were directed. Even in the absence of reports, certain key areas were covered once or twice in suitable weather.

We have collated records for more than a 15-year period — 1968 to October 1983. Mezibroski, as a STEP student in the Wildlife Branch in summer 1982 and 1983, undertook to tabulate these records in his spare time, counting and recording the number of sightings on a monthly basis, on an annual winter basis and on an annual basis. The winter period was arbitrarily defined as the time from October through April when owls were most visible. Many co-operators, out looking for birds in general in summer, would have observed owls had they been visible, and we always kept an eye out for them when we were travelling during the nest-checking period of our activities. At first an attempt was made to eliminate bias introduced by observers reporting sightings of what could be the same birds by lumping records for the same place or date, but this was dropped in favour of a total count, so that the figures reveal not so much the number of owls present as their visibility, that is, the total number of sightings.

By banding birds in winter, some absolute counts were obtained. In addition, colour marking (carried out in some years) provided an opportunity to estimate numbers of owls by comparing the number of marked to unmarked birds. Numbers of individuals seen in one day, or in two consecutive days, permitted a direct count, sometimes of substantial numbers. Numbers of dead owls, even, sometimes offered astonishingly high counts (see below). Colour marking also provided a means of determining movements of birds; more precise information on movement was gained in the winter of 1982-83 when individuals were identified by numbered tags.

Results

OWL SIGHTINGS: For the 15-year period 3,360 sightings of Great Gray Owls were recorded by 641 different observers. These records would have greater meaning if there was some means of calculating an index relating number of sightings to "observer hours" or "kilometres driven". This could be done for observations by Copland and Nero who regularly searched for owls, and who kept such records, but their observations are a small part of the total (e.g. for the winter of 1978-79, when 629 observations were recorded, only 49 or 7% were made by Copland and/or Nero).

Table 1. NUMBERS OF GREAT GRAY OWLS BANDED (1968-83)

Year	*Winter*	*Year*	*Summer*
1968-69	6	1969	0
1969-70	0	1970	4
1970-71	0	1971	0
1971-72	0	1972	0
1972-73	0	1973	1
1973-74	23	1974	3
1974-75	2	1975	0
1975-76	2	1976	13
1976-77	0	1977	15
1977-78	34	1978	7
1978-79	88	1979	22
1979-80	50	1980	41
1980-81	29	1981	13
1981-82	2	1982	1
1982-83	26	1983	6

Summer banding mainly females and young. (Number banded winter 1983-84: 71)

For most observers, owls were encountered by chance, and hours involved or distances travelled were not recorded. Nevertheless, the sightings provide substantial evidence of the occurrence and distribution of owls and there is good reason to believe that the annual numerical differences (Figure 2 and Table 1) represent real variations. To some extent the number of sightings reflects the relative number of owls present, particularly reports received in a short period of time and over a large area. There is a good correlation between the number of sightings in any one winter and the number of birds that were banded (compare Figure 2 and Table 1). Incidentally, our ability to capture owls had increased greatly by late winter 1973-74.

The distribution of sightings by month is shown in Figure 1. Note that most observations are for the winter period (October through April). It will be noted that there are more observations for May than for October; it may be concluded that we should have included October in the "summer" period. April, admittedly, is a variable month for sightings; in some early springs, following the disappearance of snow, owls may not be observable. Sightings in summer (defined here as the period from May through September) were relatively scarce, probably owing to a change in owl activities. For most of the year Great Gray Owls are inconspicuous, but in certain winters many individuals may be found perched near highway rights-of-way and roads, hunting in adjacent grassy and weedy open areas. They also hunt on the edges of openings in the forest; some of our records were obtained from hunters, loggers, skiers and others travelling or working within forested areas. Narrow roads where there is little or no ditch seldom attract owls; birds encountered in such situations are usually wary and soon leave. In our experience, dull, overcast and calm days bring out more birds, but sometimes when it is calm they may

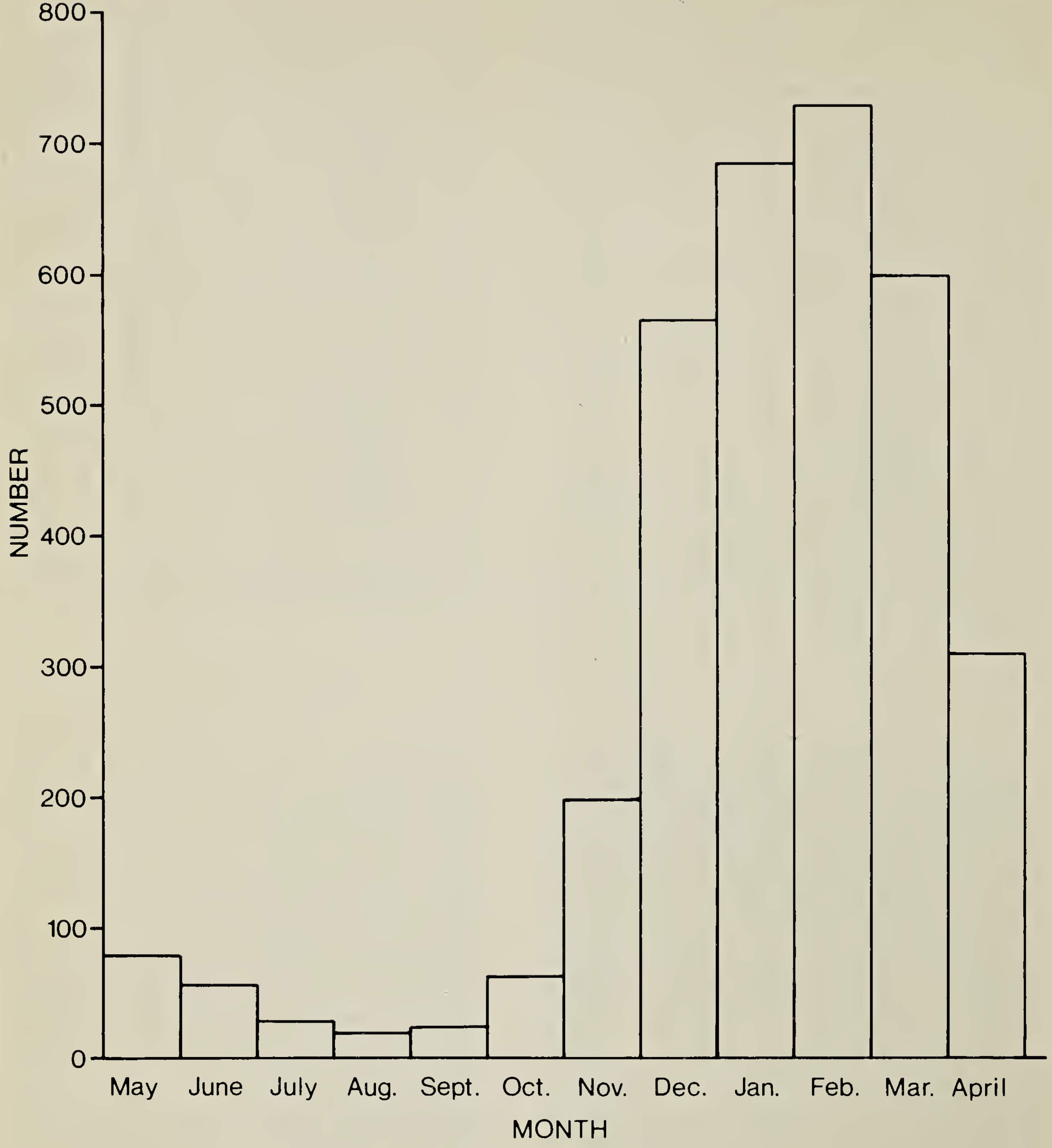


Figure 1. *Sightings of Great Gray Owls, monthly totals, 1968-83.*

be out even on bright, sunny days. Generally, more owls may be seen during the early morning and late evening hours. Days when it is calm and heavily overcast (or foggy or snowing) seem to provide optimum conditions. In some instances, especially close to the breeding season in mid-February and March, it seemed that owls were out for social reasons as much as for food. Thus, the broad outlook provided by a highway or other open expanse may have some social function.

One unusual aspect of owls in winter is a tendency for them to appear in favoured areas in successive years. Different birds (as determined by banding) use the habitat in the same way as previous occupants, suggesting that they are attracted not only by small mammals, but also by landscape features, particular configurations of woods and fields. From year to year we have learned that we are successful if we search for owls in certain places. One year on three successive weekends we banded three different owls in almost the same group of trees. If we had not been colour-marking them, we would have assumed that we were looking at the same bird. This merits further study.

The graph of annual total numbers of winter sightings (Figure 2) shows considerable variation from year to year. Sightings range from 23 in winter 1975-76, when the study was well under way and a large number of people were looking for owls, to 629 in winter 1978-79. The distribution of sightings is of special interest. Of 3,149 winter sightings for the region, 2,354 or 75% of the total number were made within a rectangular area 106 km x 184 km (66 mi. x 115 mi.) in extreme southeastern Manitoba (see Map 1). This may be due to a combination of factors — a wide network of roads, numerous observers, and because it is particularly attractive to owls, both residents and visitants. Ecologically, the area is mainly mixed-wood forest with a fairly large amount of black spruce-tamarack bog. Nero noted: "Here, a band of black spruce and tamarack-muskeg country a few dozen miles wide and a hundred miles from north to south lies adjacent to the rocky Precambrian Shield region.... A mixture of old burns, cleared forest, marginal cropland, abandoned fields, grassy meadows, pine and spruce woods, bogs and streams...."[12] The area appears to be unique in Manitoba.

Nero with banded and tagged adult female. *Robert R. Taylor*

The remaining 25% or 795 sightings were made throughout a large portion of the province, from Riding Mountain National Park in the west, north to far northern areas such as Cranberry Portage, Snow Lake, Thompson, Gillam and even Churchill (Map 1).

Some winters, few owls are seen despite extensive efforts to find them. Note, for example, the scarcity of observations for the winters of 1970-71, 1972-73 and 1975-76 (Figure 2), years when a special effort was made to obtain observations and at a time when there had already been considerable publicity. There is evidence that in these winters owls still are present but, presumably because they are able to find sufficient food within the forest they are seldom out on roadsides, at least in the daytime. There is information showing that in some winters owls simply were not visible along roads even in known breeding grounds and sites where owls were known to be present within the forest. It is not possible to estimate the numbers of such birds in these years, although active nests in the following season provide some indication.

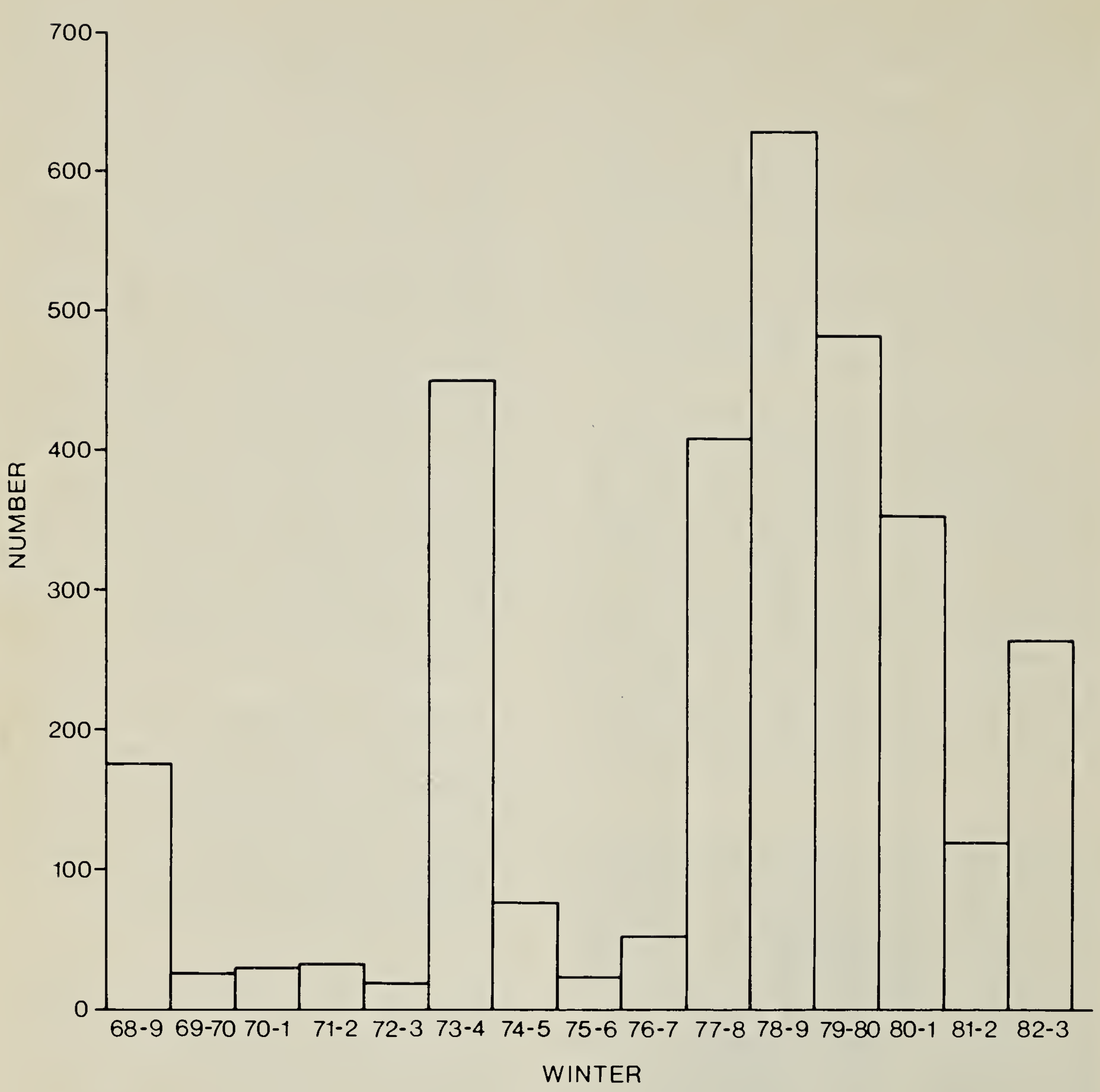
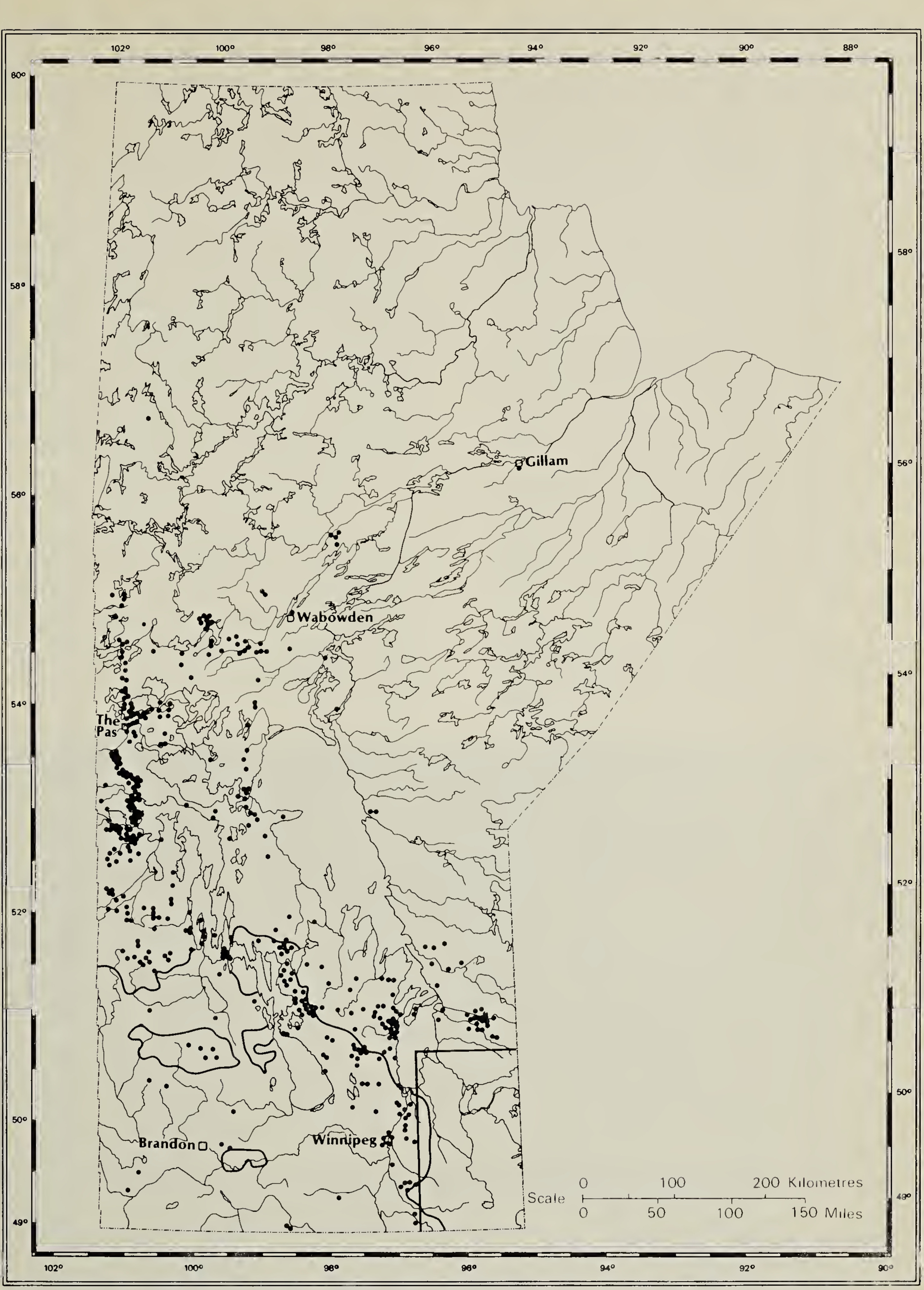


Figure 2. *Winter sightings (3149) of Great Gray Owls, annual totals 1968-69 through 1982-83.*

On the other hand, if there is a scarcity of food within a particular area, local populations may move elsewhere. Stephen L. Loch has shown that a radio-marked Great Gray Owl emigrated from a breeding area in Minnesota to haunts in Ontario approximately 275 km (165 mi.) away in less than a month's time (pers. comm., 1981). At this rate of travel, it is easy to understand that owls could, in a relatively short period of time, move completely across southeastern Manitoba to find a suitable supply of prey. This may be the way in which winter concentrations of 5 to 50 owls develop in a few days or weeks.

Some winters, owls apparently move from northern areas into more southerly parts, such movements occasionally being accompanied by numbers



Map 1. *Winter sightings of Great Gray Owls 1968-69 through 1982-83, excluding the southeastern corner where 75% (2354) of winter sightings occurred. Dots represent sightings; heavy lines show the southern boundary of the mixedwood region and outlying areas.*

of Northern Hawk-Owls, a species that obviously comes from farther north. According to Heimo Mikkola, a noted Finnish owl specialist, the invasions of the Great Gray Owl (in Eurasia) manifest the same dynamics as the Northern Hawk-Owl. In years with a normal vole population most Great Gray Owls spend the winter in the breeding region; during mass die-offs of voles, however, conspicuous invasions occur and these owls wander in all directions within the coniferous zone (from a translation).[4] Great Gray Owls also move northwards from southern breeding grounds. Band recoveries of owls in winter in extreme southeastern Manitoba consist of local residents as well as some birds from northern Minnesota (e.g. a bird captured east of Winnipeg on 5 April 1981 had been banded by Loch on 10 April 1978, about 357 km (223 mi.) to the southeast).[13] This has also been demonstrated by Loch's work with radio-marked Great Gray Owls in central-eastern Minnesota where most members of a local breeding population moved northwards over winter into northern Minnesota and adjacent Ontario (pers. comm., 1984).

Despite the presence of a fairly abundant resident population of owls in southern Manitoba, surprisingly few birds have been sighted outside the mixedwood region (Map 1). There have been no occurrences here of the kind of influx of owls far outside the breeding range, as observed at intervals in southern Ontario, Quebec and the New England States.[20]

From May through September owls were sighted over the 15-year period in relatively low numbers compared to winter (Figure 1, Maps 1 and 2). Records for 14 summers (1970-83) for which there are observations (apart from owls seen at nests, or family

Incubating female. Spreading of the bristle feathers that normally cover the bill denotes anxiety *Robert R. Taylor.*

groups) are as follows: May — 1 to 16 sightings (average 5.1), June — 0 to 9 (av. 3.6), July — 0 to 5 (av. 2.1), August — 0 to 5 (av. 1.3) and September — 0 to 7 (av. 1.8). For the entire period there were only 4 months with 10 or more records. Note that the highest summer count of 16 is for May 1978; winter sightings prior to that summer were high and peaked the following winter. In summer the Great Gray Owl is an elusive bird except at its nest. Even where active nests were less than 100 yards off roads, birds were seldom observed. Thus, except in certain winters, this species behaves like most owls, keeping well within its woodland habitat.

A feature which may affect the number and winter appearances of owls is the annual variation in the production of young. The Great Gray Owl's reproductive potential is fairly high; three to four eggs per nest is average, but as many as six have been found here. Mikkola points out that in Scandinavia the clutch size and the fluctuations in egg number are largest with the Great Gray Owl (among the *Strix* owls), which is the most specialized for restricted prey, namely small rodents and shrews. He notes further that in this respect the Great Gray Owl more resembles the Snowy Owl and the Northern Hawk-Owl and the *Asio* species than it does two of its nearest relatives, the Tawny and Ural owls. Mikkola states that the size of the clutch of the Great Gray Owl changes in accordance with the size of the vole population, so that there are significant differences between years of a high and a low vole population. In Finland and Sweden the number of fledged juveniles is highest when vole populations are high. "The fact that the young triple their weight within five days and weigh about 500 grams at 14 days (with a hatching weight of 40 grams) illustrates indirectly that a rich food supply is essential for their survival. It is easy to understand how this owl, as a decided specialist, reacts so sensitively to changes in the density of the supply of small mammals" (translated).[4]

Female brooding young. *Robert R. Taylor*

In winter 1980-81 in Manitoba of 50 owls killed in a relatively small area, 44, or 88%, were immatures from the previous summer, and of 24 other owls banded that season in that area, 20, or 83%, were immatures.[13] (On the other hand, in winter 1983-84, of 71 owls banded, five road kills, and perhaps 30 others closely observed, *all* were adults; evidently there was little nesting or poor survival in summer 1983.)

DISTRIBUTION OF OWLS: Although observations of Great Gray Owls were sought throughout the province records for the more remote areas are relatively scarce. By comparison with southern and extreme southeastern Manitoba, most areas of central and northern Manitoba have fewer roads and observers. Nonetheless, Natural Resources Officers, stationed at a number of northern cities and towns, regularly travel, in all seasons, some key roads. There are enough winter sightings in western central Manitoba to show that owls were being observed annually in that region (see Map 1). Although more observers were available in extreme southeastern Manitoba, there were fair numbers of people looking for owls in the Interlake region and elsewhere. Even within extreme southeastern Manitoba, owls were irregular in appearance, occurring in various parts of the area each winter.

Immature owl in winter
Robert R. Taylor

NUMBERS OF OWLS: The estimated number of owls present in the province or in any particular area at any period is difficult to derive, but some data are available. In winter 1968-69, for example, it was estimated on the basis of number of sightings, area of distribution of sightings, and daily high counts, that at least 100 owls were present in extreme southeastern Manitoba.[7] Owls were seen during that winter, however, over a much larger area. The total number of owls present in southern Manitoba was probably much greater.

An estimated 36 owls were present in the Lac du Bonnet area in a circle with a diameter of about 66 km (40 mi.) from 5 February to mid-March 1974. High counts within that relatively small area were 18 on 17 February, 23 February and 30 February, 17 on 2 March and 10 on 7 April. During roughly the same period (15 January - 28 February 1974), an estimated 50 owls were present in less than one township (36 sq. mi.) along the Summerberry River, 25 to 33 km (15 to 20 mi.) southeast of The Pas. Up to 15 were seen in one day by Ducks Unlimited (Canada) staff who were working along the river (Ron L.

Schiedel). That area is about 500 km (300 mi.) northwest of the Lac du Bonnet area. South of the Summerberry River area, 11 owls were noted on the morning of 20 January 1974, by Joe D. Robertson while travelling at highway speed along PTH 10 between Mafeking and "The Bog", a distance of about 50 km (30 mi.). During the same period (15 January to 28 February 1974), owls were reported from 30 other localities spanning a large region from the Duck Mountains on the west to north of the Bloodvein River on the east side of Lake Winnipeg. We had no evidence that owls were moving through the region during this period, many being seen repeatedly in the same localities over several weeks and practically none showing up at other localities. This suggests that there were at least several hundred owls present at the same time, possibly up to 1,500, in the mixedwood and northern coniferous forest regions of the province.

In 1981, a direct count of 50 owls was obtained in a relatively small area east of Winnipeg, that number of vehicle-killed owls being retrieved from 1 January to 30 April. In addition, 24 owls were captured and banded in that area in roughly the same period.[13] It was estimated that at least another 50 birds were present in the area. Several of these birds, as determined by band recoveries, were local residents.

[From January through March 1984, more than 100 owls (of which 67 were captured and banded) were believed to be present within a circle with a diameter of less than 80 km (50 mi.), 48 km (30 mi.) northeast of Winnipeg.]

It needs to be emphasized that estimates of numbers of owls in this region do not take into account the extremely large areas of suitable habitat that were not accessible by roads. Even in extreme southeastern Manitoba, despite a wide network of roads, only a relatively small portion of the area could be sampled. Roads that regularly produced good numbers of owls (e.g. PR 317 and PR 304) cut across extensive tracts of highly suitable range. It seems likely that estimates of numbers of owls are relatively low.

WINTER CONCENTRATIONS:

One of the striking aspects of winter appearances of Great Gray Owls has been the occasional concentration of large numbers of birds in relatively small areas. Ray and Jim Salt note that "In recent years there have been irregular winter invasions of Great Gray Owls into settled wooded regions. These are usually local in nature extending over only a small part of a province, but the number of birds may be relatively large."[16] Evidently, they have included reports of owls in Manitoba in developing this statement. But the areas of concentration here are even smaller than they suggest. Even within extreme southeastern Manitoba, from winter to winter owls have not been found distributed evenly or widely, but have often been observed in restricted areas. The most dense concentration was found in late winter 1980-81, when an estimated minimum of 100 owls were present within an area approximately 45 km (28 mi.) in length and 8 km (5 mi.) in width. In all cases, where birds have occurred in concentrations, an abundance of food, primarily meadow voles inhabiting meadows and roadsides, appeared to be the main causal factor.

Many observers commented on the abundance of meadow voles on Amherst Island near Kingston, Ontario, in winter 1978-79, when unusually large numbers of Great Gray Owls and other raptors crowded onto the island. Some 34 Great Gray Owls were present at the same time, with

Hunting owl confronts the photographer *Robert R. Taylor*

nine being seen at once in one tree (pers. comm., Fred Cooke, Richard M. Poulin, 1979). Two other observers, in an account of the widespread influx of Great Gray Owls in southern Ontario, Quebec and the New England States that winter, noted that: "Where exceptionally abundant food persists, these owls will gather in large numbers."[20]

In connection with the concentrations in Manitoba, presumably scarcity of food elsewhere (as in forested areas), snow depth and icy crusts, led to movements of hungry owls to sites where prey was abundant and available. This suggests that even within the relatively small region of extreme southeastern Manitoba, vole population levels are not necessarily synchronized, but vary widely from place to place. If this is so, then it increases the difficulty of predicting owl movements, concentration points, length of stay in winter feeding sites, and effect on later nesting. But it does provide a partial explanation for the complicated and puzzling patterns of winter occurrences of owls. Nonetheless, certain areas have attracted owls often enough so that it is clear that such sites are significant winter feeding grounds, though varying annually in prey productivity.

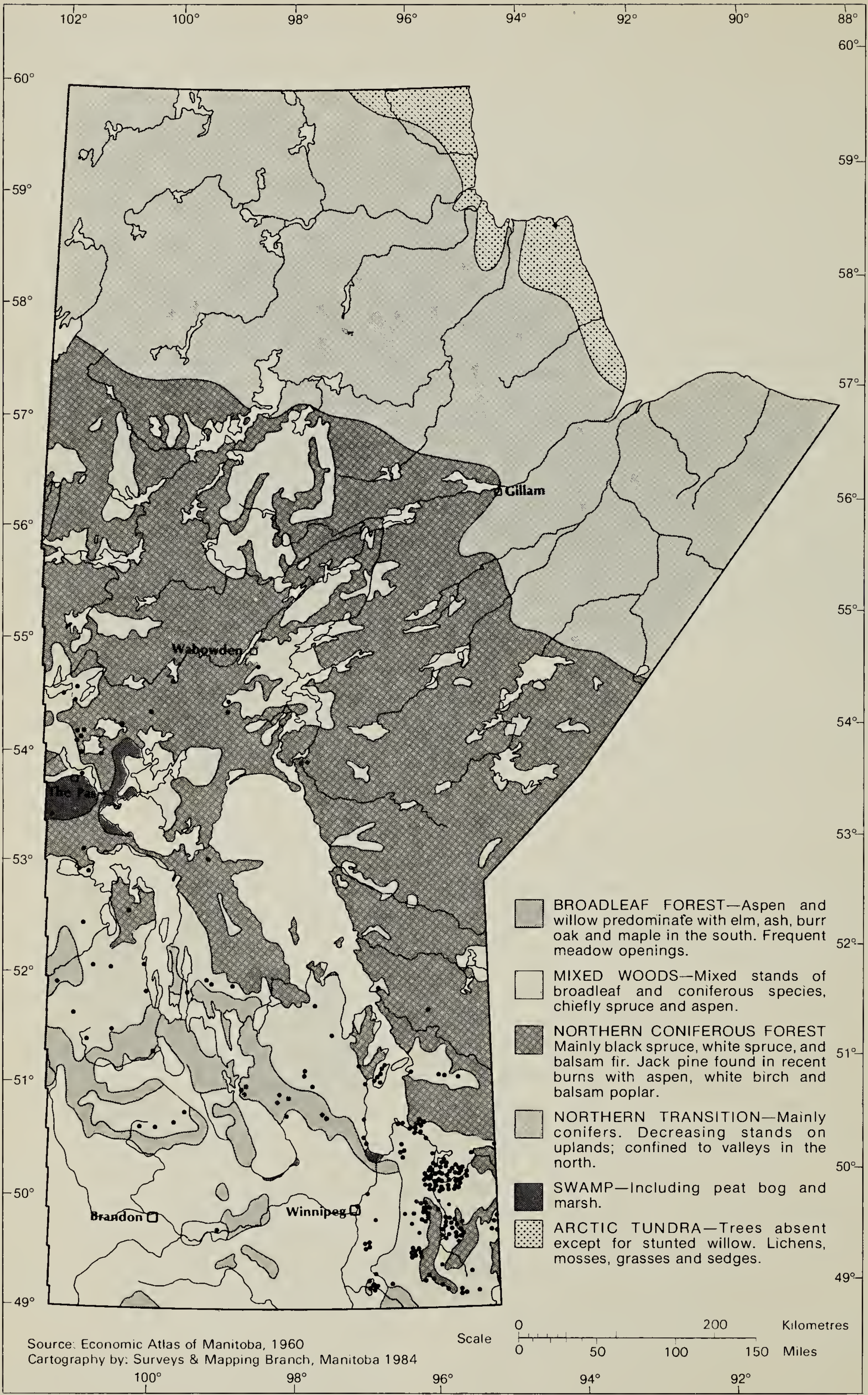
Vole population levels measured over more than a decade at Pinawa show little relationship to winter owl sightings, though the highest meadow vole population ever measured occurred in winter 1978-79 (Steve Mihok, pers. comm., 1984), when the largest number of sightings of owls occurred (Figure 2). This was followed by one of the best breeding seasons for owls

The distinctive mark left in the snow by a hunting Great Gray Owl
Robert R. Taylor

we observed (Table 1). Collins states that "The effects of the winter density of prey on the population movements of Great Gray Owls depend largely on the size of the winter Great Gray Owl population as determined by the prey densities of the previous spring and summer."[1] The subject of owl-prey relationships is complex and merits further study.

Another little known factor in relationship to winter concentrations of owls is the distance or the direction which owls may be moving over the course of a given winter to find a food source. Although there is evidence showing that some individual birds remain in one site for weeks or even months, others (unbanded) appear over time, suggesting that some owls are forced to continue moving in search of food for longer periods than others. There is also some evidence that certain roads may act as interception lanes, temporarily attracting and halting birds (whether for food or the attractiveness of an open vista) which may have been moving through more or less solid blocks of forest. Sections of certain roads passing through good mixedwood habitat have from season to season proved to be good places to look for owls, in some instances stretches only a few kilometres in length regularly producing new birds (as shown by trapping and banding). There is reason for believing that certain wooded creek basins may function regularly as travel lanes, both for hungry birds and birds returning to familiar breeding grounds. These matters, however, are complex, requiring far more information before being understood. In terms of habitat preservation, however, it may be important to identify these and other topographical-ecological aspects of Great Gray Owl distribution and movement.

SUMMER SIGHTINGS AND BREEDING RECORDS: All of 213 summer sightings and 56 breeding records of owls (includes one nest for 1926 and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The Pas
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Winnipeg
BROADLEAF FOREST—Aspen and willow predominate with elm, ash, burr oak and maple in the south. Frequent meadow openings.
MIXED WOODS—Mixed stands of broadleaf and coniferous species, chiefly spruce and aspen.
NORTHERN CONIFEROUS FOREST Mainly black spruce, white spruce, and balsam fir. Jack pine found in recent burns with aspen, white birch and balsam poplar.
NORTHERN TRANSITION—Mainly conifers. Decreasing stands on uplands; confined to valleys in the north.
SWAMP—Including peat bog and marsh.
ARCTIC TUNDRA—Trees absent except for stunted willow. Lichens, mosses, grasses and sedges.
Scale
0
200
Kilometres
0
50
100
150
Miles

Source: Economic Atlas of Manitoba, 1960
Cartography by: Surveys & Mapping Branch, Manitoba 1984

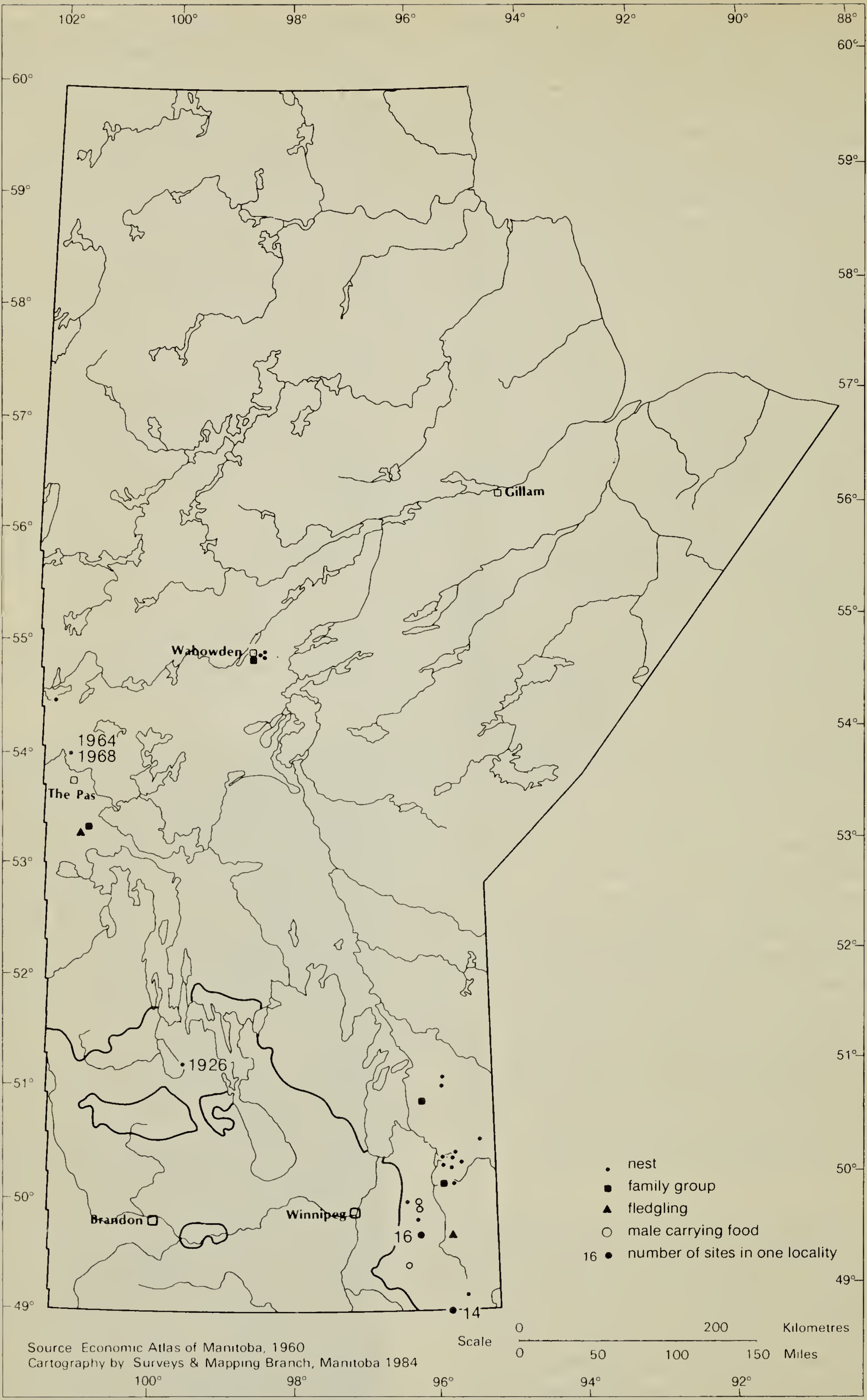
Map 2. *Summer sightings of Great Gray Owls (May-September, 1968-83), not including breeding observations.*

1964) are shown on Maps 2 and 3, respectively. The large number of recent breeding records in extreme southeastern Manitoba is partly related to the amount of time spent looking for nests in that area and especially to the installation and successful occupancy of man-made nesting structures. The absence of natural nest structures in some blocks of habitat that were searched, plus the readiness with which man-made structures were accepted, suggests that nest structures may be a limiting factor in some habitat types. Of five nests built one December along a 3.3-km (2-mi.) stretch of road, three were occupied by owls the following April (1977). Fifty-four breeding records in 15 years (1968-83) represents a considerable increase over previous known nestings of this species in the province, but it is likely that this is only a small part of all Great Gray Owl nestings in Manitoba in this period. This species is capable of responding favourably in situations where nests are available and when small mammal populations are high. In Sweden, Ove Stefansson recorded an incredible 129 breeding records in only two years (1981, 1982)![18] How this may happen is suggested by Mikkola, who writes that: "There are some indications that nomadic Great Gray Owls move with other owls... when searching for new breeding areas after a crash in the vole population. When these invading birds find a suitable new area with plenty of voles, they may nest in loose colonies, like Short-eared Owls...."[5]

Although there are fewer than a dozen breeding records for Manitoba outside of the extreme southeast, the records suggest that the species breeds across the mixedwood and northern coniferous forest regions as shown by Weir.[21] It also seems likely that the northern transition forest region provides suitable habitat, for Great Gray Owls have been recorded nesting in similar habitat at Moosonee, Ontario, near the shore of James Bay (pers. corr., Ken F. Abraham, 1983). In this connection, it is interesting to note that there are two sight records of Great Gray Owls beyond the transition forest in Manitoba: one was seen on 18 June 1949 near Churchill, the other on 4 June 1972 at La Perouse Bay, east of Churchill.[3] [2] Thus, Manitoba has a large expanse of potential breeding habitat for this species. It would be unwise, however, to assume that there is an unlimited amount of habitat for Great Gray Owls in Manitoba, or that they breed evenly across the forested region. Scarcity of grassy meadows within the Precambrian Shield, for example, may pose a limitation to vole populations and thus to owls.

Extreme southeastern Manitoba harbours a good-sized breeding population (in most years), and areas in the

Adult female Great Gray Owl near nest *Robert R. Taylor*



Map 3. *Great Gray Owl breeding records. Nests for 1970-83, unless dated. Heavy line shows southern boundary of mixedwood region and outlying areas.*

vicinity of The Pas and northwards east of Lake Winnipeg may likewise support large numbers of owls. It is uncertain whether the species breeds in outlying areas of mixedwood habitat that appear to be suitable (e.g. Riding Mountain National Park). The late J. Dewey Soper does not mention the species[17] but there are two recent summer records for the park that suggest a possibility of breeding. Park records include mention of two Great Gray Owls seen in June or July 1979, with "nesting behaviour exhibited." On 4 and 5 July 1981, two owls "presumably a pair" were observed. There is no apparent reason why the species would not nest in the park except that this is an isolated block of habitat. Their occurrence in the park, however, is uncommon, if not rare. A report of two Great Gray Owls seen by Calvin Cuthbert in June 1973 in the much smaller and more isolated Spruce Woods area east of Brandon (Map 2) further suggests occasional nesting in these sites. An early record of a Great Gray Owl at Carberry (in the Spruce Woods area) is of interest; Thompson (E.T. Seton) collected one there on 29 September 1884.[19] That the species can nest outside the mixedwood region is shown by E. Robinson's 1926 nest at Dauphin Lake.[7]

OWLS FOUND DEAD: The low number of owls hunting on roadsides in the summer period is reflected in the number killed or found dead. From 1969 to 1982 only 10 were found in summer compared to 173 in the winter months during the same period. This gives a total of 183 known dead owls in 15 years; it does not include a few injured owls that were placed in captivity in zoos or rehabilitation centres. In winter 1968-69, at least 10 were known to have been shot. In winter 1969-70, 11 were found shot. The total during the 15-year period is a minimum of 26 shot birds. There were 157 that were killed accidentally through collision with motor vehicles. Other mortality factors include: collision with trains — 2, accidental trapping — 2 (probably larger), predation by Great Horned Owl — 3, electrocution — 2, barbed wire — 1. The greatly reduced number of shot owls from 1971 to 1983 suggests that the intensive Great Gray Owl publicity campaign markedly affected the attitude of people toward the species. One resident of southeastern Manitoba said he was certain that these activities had improved people's thinking about owls and raptors in general in this area. It is well known that in some years numbers of Great Gray Owls perish from starvation. This factor, however, is difficult to measure. In this region, motor vehicle collision casualties remain the most conspicuous mortality factor for the species. Illegal shooting remains a problem. Any official change in law or attitude towards these relatively bold and conspicuous birds is likely to affect the degree to which they are subject to gunning. Every effort should be made to maintain and increase the present level of respect and appreciation generally held by the public for these and other raptors.

Discussion

The appearance of Great Gray Owls in extreme southeastern Manitoba in winter 1968-69 was regarded as an "influx" of owls; some long-time residents of the area even reported that the species had rarely been seen before that winter.[7] Later, upon discovering that Great Gray Owls were apparently present and breeding annually in this area, this point of view changed; more emphasis was placed on the status of owls observed here in winter as local residents. With accumulating information, particularly band recoveries indicating movement of birds between Manitoba and Minnesota (both north and south), it became apparent that the situation was fairly dynamic. The emerging picture of the Great Gray Owl in Manitoba generally is one of fluctuating numbers, both in terms of birds in summer and in winter, and with varying reproductive success relative to small mammal populations (though this still requires documentation within this region). Less is known about the summer population of owls because of the reclusive nature of the species during that season. This is complicated by apparent variations in prey populations over even short distances (more so in winter?), and changing prey levels over time. Winter populations of owls are generally more subject to measurement than summer populations, although it is clear that in winter mainly food-stressed individuals are being observed.

Mikkola reports from Scandinavia that this species does not show any adaptability to declining prey populations, which would facilitate a sedentary existence, and allow it to remain on the breeding grounds in years of poor food supply without breeding. He concludes that most of the population leads some sort of nomadic life.[5] This would seem to supply a satisfactory explanation for the variable numbers observed in Manitoba over the 15 years of this study. Much more information is required on population size and density before it will be possible to determine how this species is faring. More attention as well will have to be given to small mammal populations and their requirements in diverse habitats within the breeding range of this owl.

There seem to be more Great Gray Owls in southern Manitoba now than in earlier years. Accounts of "invasions" of owls in the Winnipeg area in the 1920s[7] suggest that the phenomenon of increases or conspicuousness of owls in winter is not a recent event, but what can be said about average resident populations? The absence of density figures or estimate of summer populations makes any assessment difficult. One has to bear in mind, too, that in earlier years there were far fewer roads (and it has already been shown how attractive roads are to owls, at least in winter) and fewer observers. Mikkola points out that the density of Great Gray Owl populations depends on the availability of food, high density populations only being observed during good vole years.[4]

A hunting owl listens intently *Robert R. Taylor*

What is perhaps more to the point is Mikkola's statement that "The fact that the Great Gray Owl has become more common in Finland from 1954 to 1981 may be connected with the climate which has become colder... Kauko Hahtala, in his unpublished Ph.D. thesis, shows that climatic changes have produced a similar increase for several northern and eastern bird species in Finland, as well as for the Great Gray Owl... many more Great Gray Owls have been found breeding in peak years in the 1960s and 1970s compared with those of the 1950s."[5] Great Gray Owls may have increased in southern Manitoba over the past three or four decades, but until there are some data on population densities (difficult to obtain and interpret for a nomadic and fluctuating species), it will be difficult to define precisely the status of the species. In the past 15 years there appears to have been from several hundred to several thousand Great Gray Owls in Manitoba.

Does this mean that there are no management problems with the Great Gray Owl in Manitoba? As with all wildlife species, maintenance of suitable habitat is a primary requirement to ensure the continued presence of this inspiring bird. In the more remote transition forest region, fire-caused openings in the forest, subsequent growth of grass and islands of aspen poplar, plus the factors of isolation and lack of forest harvesting may continue to provide suitable habitat for the species. Over some of the commercial forest region, however, cutting practices may need to be altered to ensure that there is a place for owls. The Great Gray Owl has prospered in the midst of considerable human activity and continuous logging in extreme southeastern Manitoba. But new demands for tamarack for pulp, with widespread clear-cutting now taking place in extreme southeastern Manitoba, indicate a need for new insights into owl habitat requirements, both in summer and winter. Under present tamarack harvesting methods, large blocks of nearly ideal habitat are being made uninhabitable. Clearly, there is a need for new information and adjustments of forestry practices to accommodate the needs of this species, as well as other wildlife.

Lightweight Great Gray Owls perch on slender boughs *Robert R. Taylor*

New demands for peat (for mulch in Manitoba and energy in Minnesota) present another potential threat to owl habitat which needs to be evaluated. In Manitoba, especially in the extreme southeast where owls are available as a special wildlife treat to so many people, it is essential that steps be taken to ensure that there is adequate habitat. Yet there is continued pressure to develop marginal land in this region for agriculture, with demands for increased drainage and removal of trees and peat in order to grow bluegrass and other crops. Removal of mature black spruce-tamarack forest cover northwest of Lac du

Bonnet and elsewhere is taking place continuously, with apparently little concern for the needs of furbearers and big game, let alone Great Gray Owls. Forestry practices can probably be modified (with some persuasion) to accommodate wildlife, but with the complete removal of habitat nearly all wildlife values are lost.

On the positive side, new studies of Great Gray Owls and their habitat needs are under way to attempt to answer some of the questions raised here and to make specific recommendations for forestry management to enhance or perpetuate Great Gray Owl habitat. Steve Loch from Minnesota, who is heading up the Manitoba Great Gray Owl project, already has many good ideas for altering cutting methods to benefit owls. Radio-telemetry studies by Loch are in progress to learn more about the movements of Great Gray Owls in this region and their use of habitats in all seasons. Better understanding of their habitat needs is regarded as a necessary first step in the management of this large raptor.

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[1] COLLINS, K.M. 1980. Aspects of the biology of the Great Gray Owl. M.Sc. thesis, University of Manitoba, Winnipeg.

[2] COOKE, F., A.J. PAKULAK, R.K. ROSS and R.K. SCHMIDT. 1975. Birds of the Tundra biome at Cape Churchill and La Perouse Bay. Canadian Field-Nat. 89: 413-422.

[3] JEHL, J.R. Jr. and B.A. SMITH. 1970. Birds of the Churchill region, Manitoba. Spec. Pub. No. 1, Man. Museum of Man and Nature, Winnipeg. 87 pp.

[4] MIKKOLA, H. 1981 Der Bartkauz [The Great Gray Owl]. Die Neue Brehm-Bücherei 538. [A. Ziemsen Publishing House]. Wittenberg, GDR. 124 pp.

[5] MIKKOLA, H. 1983. Owls of Europe. Buteo Books, Vermillion, South Dakota. 397 pp.

[6] MUIR, D. 1972. At a nest of the Great Gray Owl. Nature Canada 1: 20-22.

[7] NERO, R.W. 1969. The status of the Great Gray Owl in Manitoba, with special reference to the 1968-69 influx. Blue Jay 27: 191-209.

[8] NERO, R.W. 1970a. A visit to a Great Gray Owl nest. Ontario Naturalist 8: 4-7.

[9] NERO, R.W. 1970b. Additional Great Gray Owl records for Manitoba and adjacent Manitoba. Blue Jay 28: 72-73.

[10] NERO, R.W. 1970c. Great Gray Owls nesting near Roseau. Loon 42: 88-93.

[11] NERO, R.W. 1976. Great Gray Owl nests: building homes for rare birds. Manitoba Nature 17 (4): 4-11.

[12] NERO, R.W. 1980. The Great Gray Owl: phantom of the northern forest. Smithsonian Institution Press, Washington, D.C. 167 pp.

[13] NERO, R.W. and H.W.R. COPLAND. 1981. High mortality of Great Gray Owls in Manitoba — winter 1980-81. Blue Jay 39: 158-165.

[14] NERO, R.W., S.G. SEALY and H.W.R. COPLAND. 1975. Great Gray Owls occupy artificial nest. Loon 46: 161-165.

[15] PARMELEE, D.F. 1968. Nesting of the Great Gray Owl in Manitoba. Blue Jay 26: 120-121.

[16] SALT, W.R. and J.R. SALT. 1976. The birds of Alberta. Hurtig Publishers, Edmonton. 498 pp.

[17] SOPER, J.D. 1953. The birds of Riding Mountain National Park, Manitoba, Canada. Can. Dept. Resources and Develop., Natl. Parks Br., Can. Wildl. Serv. Mgt. Bull. Ser. 2, No. 6, 54 pp + 8 figs., 1 map. Mimeo.

[18] STEFANSSON, O. 1983. Lappugglan *Strix nebulosa* i Sverige 1979-82. (The Great Gray Owl in Sweden 1979-82). Vår Fågelvärd 42: 245-250.

[19] THOMPSON, E.E. (E.T. Seton). 1891. The birds of Manitoba. Proc. US Natl. Mus. 13: 457-643.

[20] VICKERY, P.D. and R.P. YUNICK. 1979. The 1978-1979 Great Gray Owl incursion across northeastern North America. American Birds 33: 242-244.

[21] WEIR, T.R. 1983. Atlas of Manitoba. Surveys and Mapping Branch, Department of Natural Resources, Winnipeg.

GREAT GRAY OWLS IN SASKATCHEWAN (1974-1983)

WAYNE C. HARRIS, Box 414, Raymore, Saskatchewan. S0A 3J0

I saw my first Great Gray Owl in the spring of 1974 along the east side of Montreal Lake. It was late and dark and I saw only a silhouette, and to be truthful could not be 100% certain that the two birds seen were actually Great Gray Owls. However it was sufficient to spark my interest in the species. A check of the literature at that time showed that there were very few Great Gray Owl records for Saskatchewan and that it had not been too long ago that the Great Gray Owl had been considered a rare and possibly endangered species in North America. Had it not been for the work of R.W. Nero and H.W.R. Copland in southeastern Manitoba the rare/endangered status may still have held in 1974.[20] It was, however, still considered rare in Saskatchewan. Although I spent all of the summer of 1975 working and travelling in the forested areas of central Saskatchewan, I was not lucky enough to see another Great Gray Owl in spite of the hundreds of hours spent looking. It was not until September of 1975 that I, along with Sheila Lamont, encountered another Great Gray Owl. We did not see it, but the encounter remains permanently impressed in my memory, and remains more impressive than any other encounter with birds I have ever had.

We were asleep and it was the middle of the night when I heard a Great Gray Owl in my "dreams". In a semi-sleep I sat up but the calling continued. It was not a dream, but reality! I had listened to that deep, resonating hoot so many times on Peterson's records that there could be no mistaking the call of the Great Gray Owl. I woke Sheila and we went looking. It was calling from aspen forest northwest of Little Amyot Lake. It quit calling when we moved in its direction. It did not call again that night or the next, but two nights later on 18 September we heard it again, calling from the same area. This time we did not "chase" it but lay there in the middle of the night listening to it for more than an hour until falling asleep — the ultimate in music to sleep by!

Those encounters were the beginning of my interest in Great Gray Owls and this article briefly summarizes observations collected during the past ten years.

History in Saskatchewan

In 1957 Houston summarized all records of the Great Gray Owl known to that date.[10] There was a grand total of 28 records with most of them from the 1950s. Undoubtedly due to Houston's article there were five reports published in the *Blue Jay* in the next two years.[1 2 7 11 18 26] The next 13 years saw only 13 sightings reported within the province, an average of one owl per year.[9 11 14 15 16 19 24 28] Thus as of 1973 there were but 41 sightings recorded for all of Saskatchewan; one would have assumed that at that time Houston's quote of Edgar Jones that the Great Gray Owl appears to be following "close on the footsteps of the beautiful Whooping Crane. There

Sketch of Great Gray Owl *K. Schmuck*

is no doubt that the predations of man will eventually force the species into extinction" could in all likelihood be true.[10]

However the work of R.W. Nero, H.W.R. Copland and others in southeastern Manitoba and Minnesota had shown that Great Gray Owls are not as rare as historical records would indicate, and that Richardson's consideration of the species as common (in the Cumberland House area) during the period 1820-27 was still true in at least a portion of its North American range.[20] [10]

1974-1983 Records

During the ten-year period a total of 316 Saskatchewan Great Gray Owl records have been tabulated (more than 250 of these by the author). Figure 1 shows the distribution of these records in the province. The concentration in the east-central part of the province is most likely a bias due to time spent searching that area rather than showing actual greater abundance. The highest one-day count was 27 February 1982 when Arnold Nijssen and the author saw four between Nipawin and Cumberland House. That same area produced 23 sightings during an 18-day period 10 February to 27 February 1982, the highest concentration located to date.

The majority of the records are from the period November through April with virtually no sightings for June through August. This is not due to more time being spent searching during fall and winter months. In fact, the converse is true. More than 75% of the time the author spent travelling in the forest was during the June to August period. Consequently Great Gray Owls are simply not seen during the summer months when they are presumably busy raising young, and are less vocal.

Hunting owl plunges into soft snow *Richard Miller*

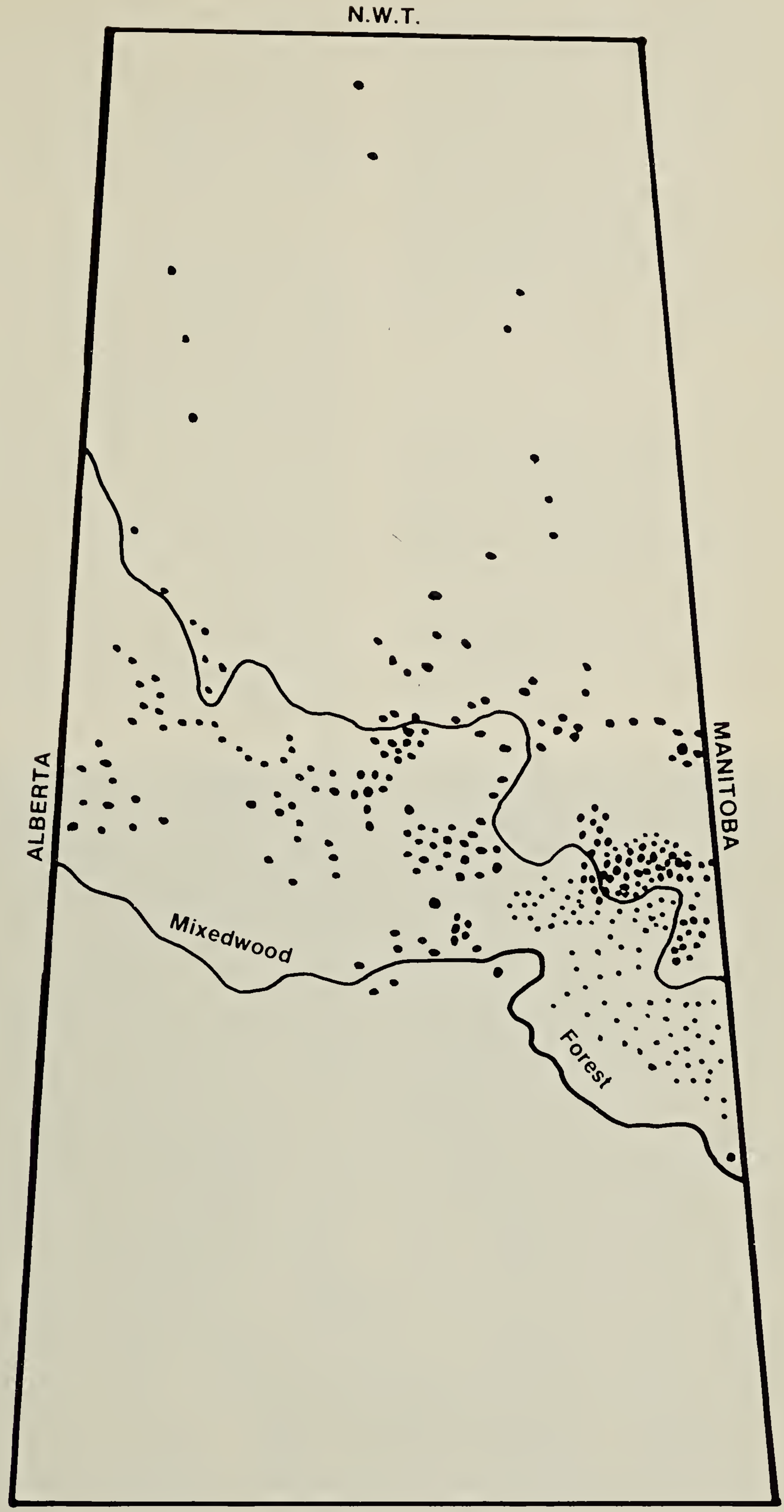


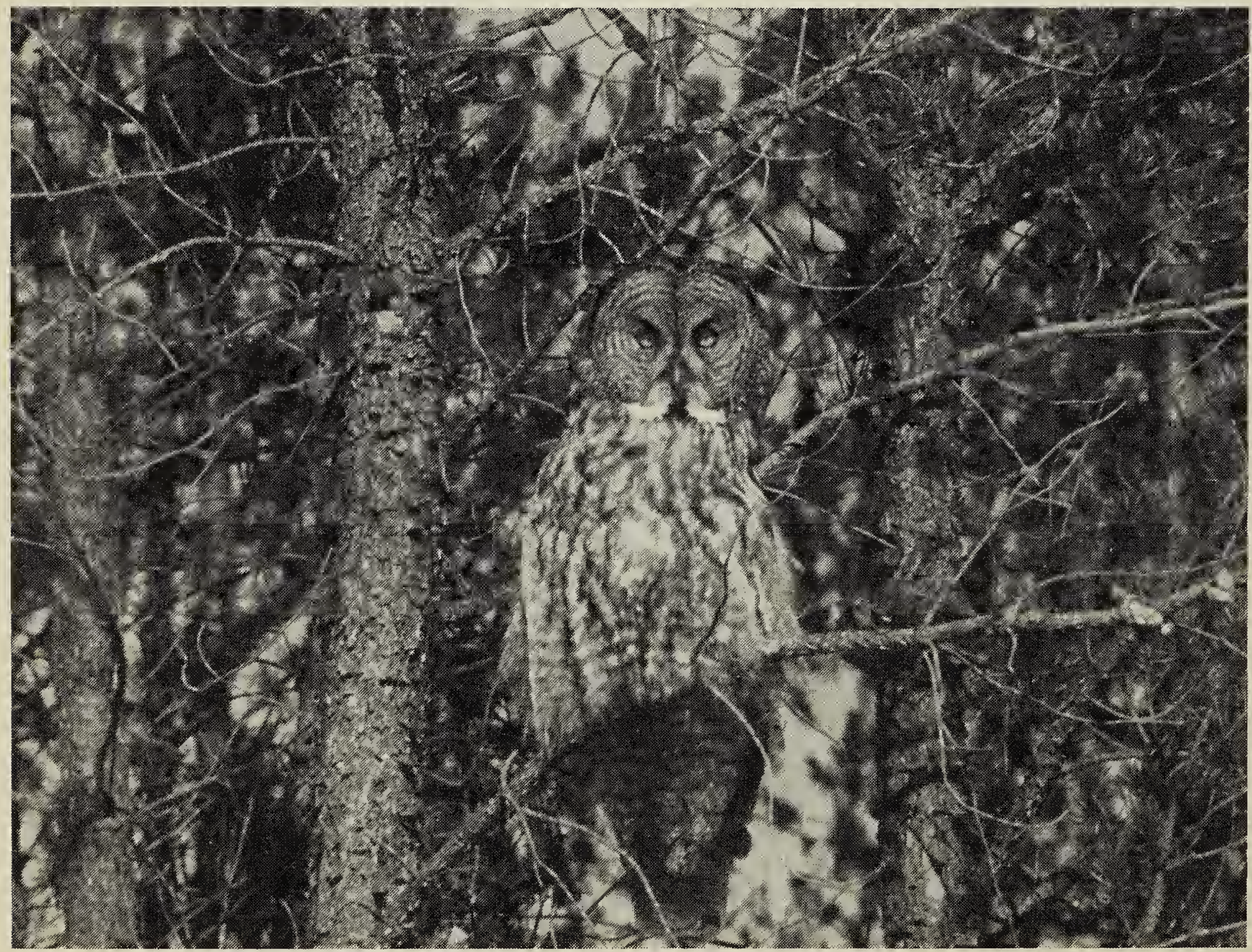
Figure 1. *Distribution of Great Great Owl sightings in Saskatchewan.*

Most of the owls were actually seen but many of the March-April-May records were heard only. During this period surveys were carried out along roads in forested areas with regular stops to listen for birds. Imitations of calls were regularly used to solicit calling from all of the forest owl species (Great Horned, Great Gray, Barred, Boreal and Saw-whet). Using this method many of the roads were covered in the southern boreal forest of Saskatchewan.

Distribution

AREAL: The Great Gray Owl is found from the northern edge of the Aspen Parkland northward probably to the Northwest Territories, although there are no records for extreme northern Saskatchewan. Spring census would indicate that Great Grays are most common in the northern Mixedwood Forest Region.[8] Although Great Horned Owls are more common than Great Grays in the southern Mixedwood Region, they are virtually equal in the northern Mixedwood. This trend holds true throughout the year with the exception of the Cumberland Lowlands where Great Grays can be more common during the winter months (i.e. 1982).

SEASONAL: Figure 2 illustrates the seasonality of Great Gray Owl sightings. Owls are much more conspicuous during late winter - early spring, undoubtedly due to the ease of obtaining food along roads. February is by far the best month to see Great Gray Owls, while late March and April is the best time to hear owls. Great Gray Owls are virtually impossible to find during July and August when adults are feeding young near nest sites and young are not yet mobile enough to reach roadways to be seen. Great Grays begin to appear



Great Gray Owl near Buffalo Narrows *Richard Miller*

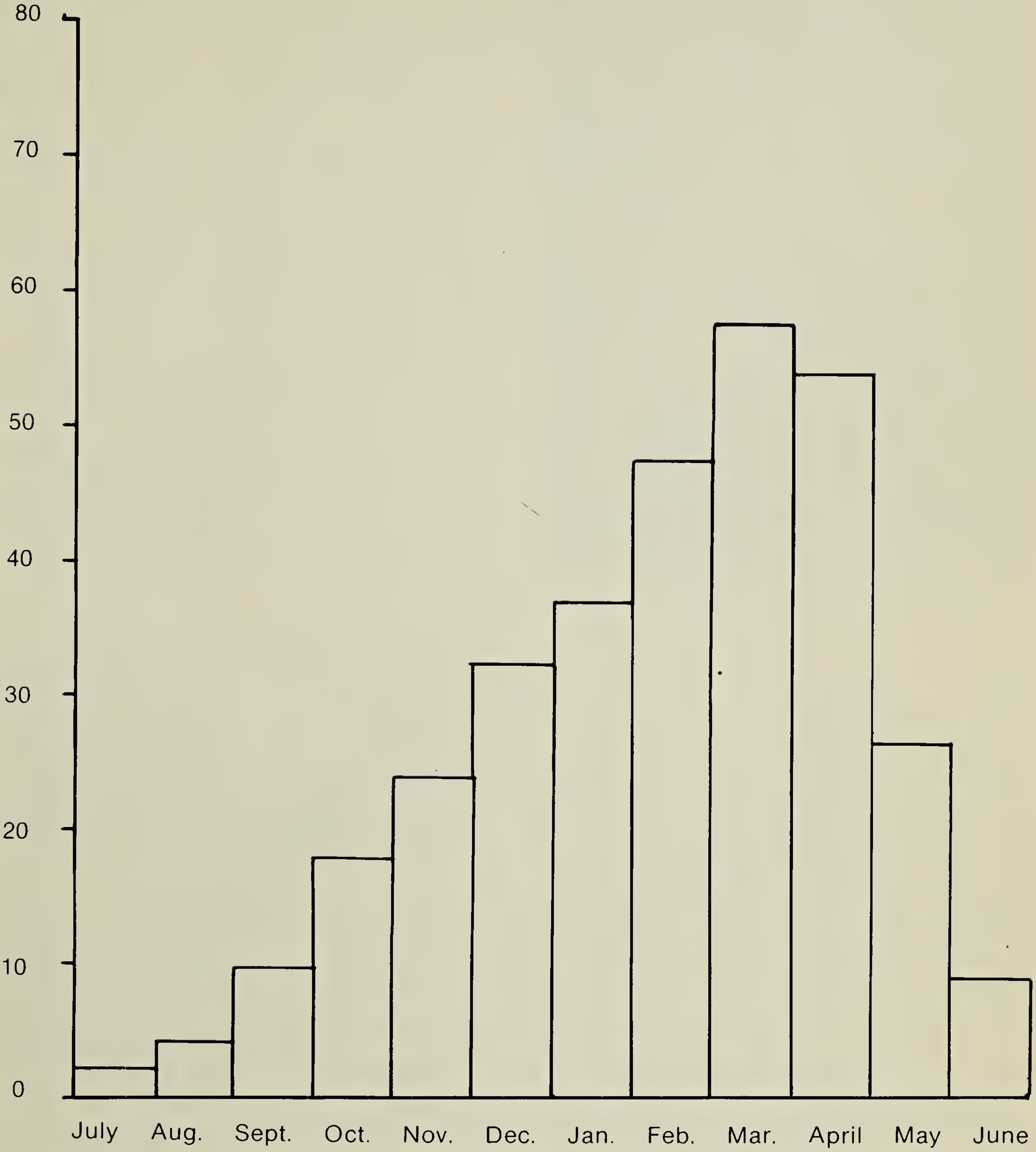


Figure 2. *Monthly totals of Great Gray Owl sightings in Saskatchewan.*

along roadsides again in October.

Habitat

Areas inhabited by Great Gray Owls are quite varied during the non-breeding season. They are found in a variety of upland forest communities from aspen to pine forest. There does appear to be a slight preference towards forests which have a mixed deciduous - coniferous (aspen - spruce) component. During the breeding season a strong preference is shown to areas which have Tamarack and Black Spruce present. Although the birds may not be specifically in this "bog" habitat, they are usually nearby.

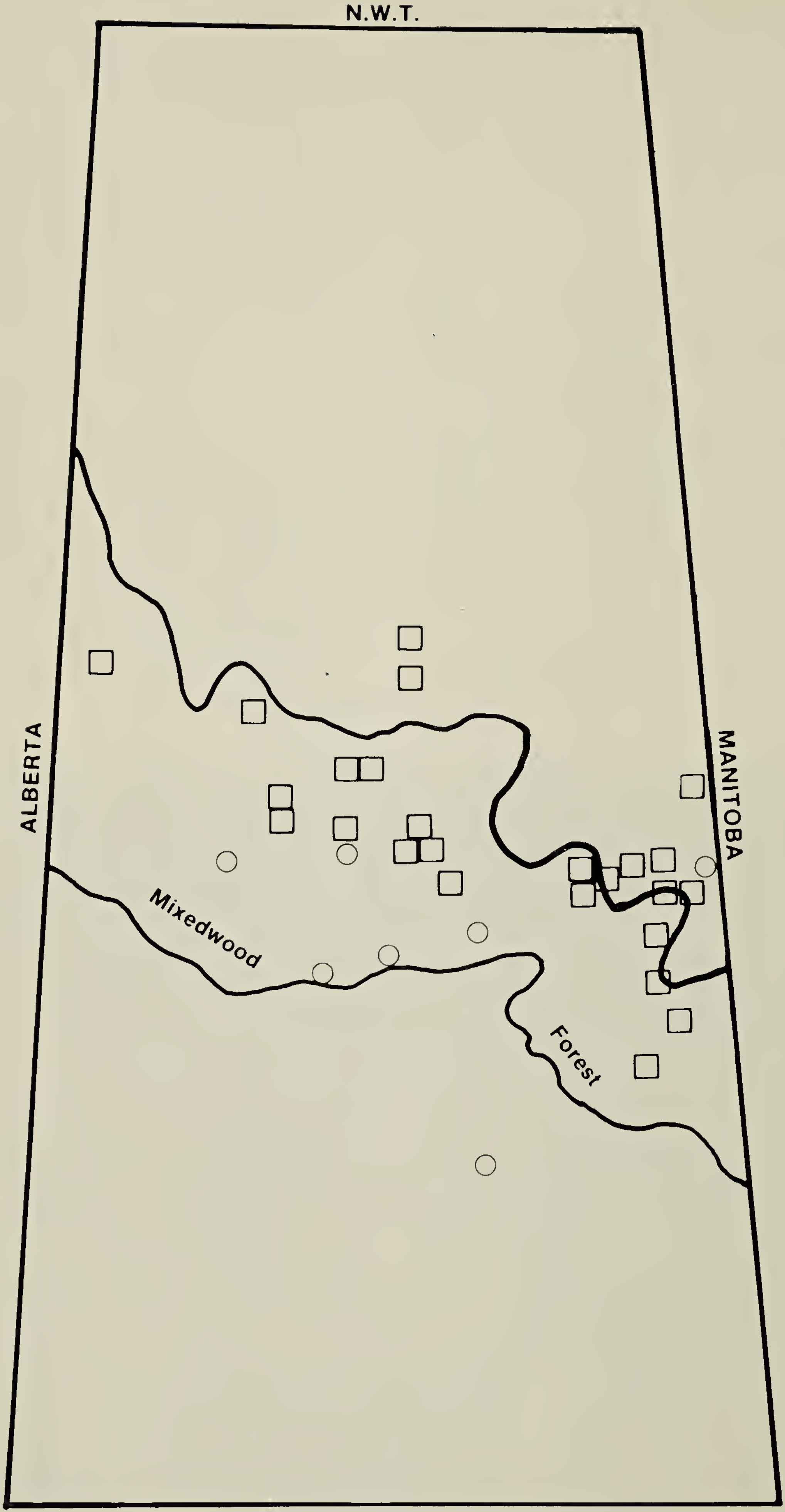


Figure 3. *Breeding records for Great Gray Owls in Saskatchewan.* ○ *Nest record or adults with young.* ☐ *Territorial pair.*

Breeding Records

Houston and Wylie list the five known nest records for Saskatchewan.[12] They do not consider those records which include young of the year or territorial pairs. The five known nests are plotted in Figure 3 along with the "unconfirmed" breeding records in an attempt to depict the known breeding range in Saskatchewan. These "unconfirmed" breeding records include fledged young still accompanied by adults and hooting adults during April and May. The breeding range is confined to the forested portions of the province. The species is more common during the breeding season in the northern portions of the Mixedwood Forest than in the southern portion. It is in this area that more Black Spruce occurs.

A review of the habitat of the 27 suspected breeding locations shows that the Great Gray Owl is very closely tied to Black Spruce - Tamarack forested wetlands. Each location of suspected breeding owls was plotted on 1:12,500 forest inventory maps to ascertain vegetation patterns. In 25 of the 27 locations a Black Spruce - Tamarack wetland was located within 500 m of the plotted location of the suspected territory. In most cases, however, the birds were calling from forested uplands adjacent to the bogs, rather than from the bogs themselves.

Summary

Although the Saskatchewan observations are few in number compared to Manitoba, the data indicates that Great Gray Owls are not as rare in Saskatchewan as previously thought. Great Gray Owls are, at the least, uncommon permanent residents of forested Saskatchewan, and may be the most common owl of the northern Mixedwood Forest. The preference for bogs is confirmed in Saskatchewan, following patterns observed in Manitoba. The tabulation of data indicates that Great Gray Owls are most frequently seen during winter and early spring, with February through April being the months of prime time. Work concentrating in east-central Saskatchewan has proven that the Squaw Rapids - Cumberland House area is by far the best area in the province to find Great Gray Owls at any time of year.

Great Gray Owls are sometimes exceedingly tame *Wayne C. Harris*

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[1] ANAKA, WILLIAM. 1961. Great Gray Owl at Spirit Lake. Blue Jay 19(4):174.

[2] BAINES, ELWIN. 1958. Summer record of Great Gray Owl. Blue Jay 16(4):155.

[3] BAINES, K.E. 1954. It is a foolish bird. Blue Jay 12(2):20.

[4] BARD, FRED G. 1947. Museum notes. Blue Jay 6(1):9-12.

[5] BELCHER, MARGARET. 1982. 40th annual Saskatchewan Christmas bird count — 1981. Blue Jay 40(1):17-29.

[6] CARMICHAEL, L.T. 1954. Protection of hawks and owls. Blue Jay 12(2):19.

[7] FRANCIS, C. STUART. 1960. Nature notes from Spruce Dale Farm. Blue Jay 18(1):3.

[8] HARRIS, W.C., A. KABZEMS, A.L. KOSOWAN, G.A. PADBURY and J.S. ROWE. 1983. Ecological regions of Saskatchewan. Technical Bulletin No. 10. Forestry Div., Sask. Parks and Renewable Resources.

[9] HARSTAD, WALLY. 1965. Great Gray Owl. Animals 6(12):344.

[10] HOUSTON, C.S. 1957. The Great Gray Owl in Saskatchewan. Blue Jay 15(3):150-153.

[11] ―――――― 1962. Further Great Gray Owl records. Blue Jay 20(1):4.

[12] HOUSTON, C.S. and K.A. WYLIE. 1984. Fifth documented Great Gray Owl nest in Saskatchewan. Blue Jay 42(3):161-164.

[13] HOUSTON, DR. STUART. 1956. Great Gray Owl banded at Saskatoon. Blue Jay 14(1):11.

[14] HOUSTON, MARY I. 1969. Twenty-seventh annual Saskatchewan Christmas bird count, 1968. Blue Jay 27(2):12-17.

[15] ――――――. 1972. Thirtieth annual Saskatchewan Christmas bird count. 1971. Blue Jay 30(2):18-23.

[16] ―――――― 1974. 32nd annual Saskatchewan Christmas bird count, 1973. Blue Jay 32(2):90-96.

[17] ―――――― 1981. 39th annual Saskatchewan Christmas bird count, 1980. Blue Jay 39(1):13-24.

[18] LAW, C. 1960. The Great Gray Owl of the woodlands. Blue Jay 18(1):14-16.

[19] NERO, R.W. 1965. Some interesting bird records for central Saskatchewan. Blue Jay 23(3):133.

[20] NERO, R.W. 1969. The status of the Great Gray Owl in Manitoba, with special reference to the 1968-69 influx. Blue Jay 27(4):191-209.

[21] NERO, R.W. 1980. The Great Gray Owl: phantom of the northern forest. Smithsonian Institution Press, Washington, D.C. 167 pp.

[22] NERO, R.W., H.W.R. COPLAND and J. MEZIBROSKI. 1984. The Great Gray Owl in Manitoba, 1968-83. Blue Jay 42(3):130-151.

[23] OEMING, A.F. 1955. A preliminary study of the Great Gray Owl *(Scotiaptex nebulosa* Forster) in Alberta with observations on some other species of owls. M. Sc. thesis, U. of Alberta, Edmonton.

[24] SEPT, DUANE. 1976. Great Gray Owl and Whip-poor-will in Prince Albert National Park. Blue Jay 34(3):164-165.

[25] SHAW, C.C. 1947. Bird notes. Blue Jay 6(1):2-5.

[26] STREET, MAURICE G. 1960. Further reports of Great Gray Owls. Blue Jay 18(1):16.

[27] SYMONS, R.D. 1967. Hours and the birds, a Saskatchewan record. U of Toronto Press. 224 pp.

[28] WADE, DOUGLAS E. and DOROTHY R. WADE. 1962. Some bird observations along the La Ronge-Churchill River and Hanson Lake Roads. Blue Jay 20(1):10-11.

FIFTH DOCUMENTED GREAT GRAY OWL NEST IN SASKATCHEWAN

C. STUART HOUSTON, 863 University Drive, Saskatoon, Saskatchewan, S7N 0J8 and KELWIN A. WYLIE, #43, 24 Central Place, Saskatoon, Saskatchewan. S7N 2S2.

The Great Gray Owl is the most beautiful of our owls. One of the greatest thrills of C. Stuart Houston's banding career was on 6 January 1956 when he became, he was later told, only the third bander in North America to band a Great Gray Owl. The owl had been trapped unharmed by Keith Thue at the Beaver Creek Game Farm south of Saskatoon; it was released near the Borden Bridge.[3] This stimulated Houston to compile all available Saskatchewan specimen records and sightings to that date.[4]

Many years passed before subpermittee Kelwin Wylie banded a Great Gray that had been temporarily stunned after flying into a car near the Turtle Lake junction on Highway #4, north of Glaslyn on 8 June 1983. Ironically the message awaited him when he reached Saskatoon after participating in the planning trip for the Turtle Lake summer meeting of the Saskatchewan Natural History Society; he turned around to drive most of the night to and from Carol Burnard's Moose Country service station at the junction. This Great Gray Owl did not last long: 48 hours after its banding and release, it was hit and killed by another vehicle on the same highway.

Since the authors share an interest in banding nestling owls, we have for years looked forward to an opportunity to band nestling Great Grays. Wayne C. Harris has on several occasions located pairs of owls in February and March that seemed to be on territory near a highway, but by April and May no nest could be found. Bert Dalziel and Bruce Donovan have similarly had no success in the Torch River area.

The first documented Saskatchewan nest of a Great Gray Owl was found near Carlton on 19 June 1902, the two eggs collected by George McCrurry (set #35471, Western Foundation of Vertebrate Zoology, Los Angeles).[1]

The second record, of a single egg on 5 July 1907 at Quill Lake (Field Museum, #7095) seemed improbable on several grounds: it was only a single egg, it was much too late in the season, and it was too far south.[1] John W. Fitzpatrick of the Field Museum in Chicago resolved some of the concerns by sending us a xerox copy of two data slips from the R.M. Barnes collection:

"Species: Great Gray Owl. Identity positive. Incubation: Addled, 2 young. Collected by E.R. Clark for C.P.F. Nest in large elm tree on side of Lake. Old nest of Hawk, flattened of sticks. 40 ft. up, and pretty dirty." The late date is thus explained by the presence of an addled egg, along with two young.

Nonetheless, some doubt persists. Herbert C. Clark was the teamster, guide and general helper to the John F. Ferry and R. Magoon Barnes collecting expedition to Quill Lake in 1909. The Clarks lived on the shore of Quill Lake and Herbert's younger brother, also interested in birds, was only 13 in 1907.[2] [5] If either Clark had sold this egg to Barnes in 1909, why did Ferry not list the species in his 1910 list? In 1909, prairie fires were no longer common, yet crow nests were still only 6 or 7 feet from the ground in regenerating aspen.[2] While one large tree might have survived fires through being near the lake, elms are not native on the Quill Lakes. One wonders whether a Great Gray Owl would have nested on the shores of a large alkaline lake in nearly open prairie habitat.

The third nest was found by R.D. Symons in 1937 "at the canyon on the Bainbridge River in the Pasquia Forest ...the nest had once been built by a red-tailed hawk."[18]

The fourth nest was found by Clifford Law in the first week of May 1949 in the Fort à la Corne Game Preserve, 8 miles southwest of Choiceland. The nest in a former hawk's nest, was about 20 feet up in an aspen, in a 5-acre stand of aspen and spruce, surrounded on three sides by open meadows.[6]

Our luck began to turn, though we did not at the time appreciate it, when Bob Finley accompanied us on the first day of Great Horned Owl banding on 5 May 1984. A week later, Bob was hunting Black Bear with bow-and-arrow in the forest reserve east of Neeb, Saskatchewan. While resting at the main camp Bob met local trapper Garry Dyck. They struck up a conversation and Bob happened to mention his owl banding a week earlier. Garry asked Bob whether we would come as far as the Meadow Lake area to band owls. Bob correctly stated that we would not travel that far for a Great Horned Owl nest. "Oh, but I know the horned owl, and my nest is another

Young Great Gray Owls after banding *C.S. Houston* kind of owl — large, dark, without ear tufts."

Bob arranged for fellow Conservation Officer Dennis Engele to visit the nest and confirm the identity of the parent birds. The Meadow Lake area was then inundated with 102 mm of rain, the roads became impassable, Garry Dyck could not get to Meadow Lake for groceries, and Dennis Engele could not get out to Garry's trapper's cabin. Finally on 21 May Engele managed the trip on a three-wheel all-terrain vehicle and next day notified us of the positive identification of a Great Gray nest with three young, one already out of the nest on a branch. That was the good news.

Then came the bad news. Dennis advised us that the 12-mile trip on forest trails would be impassable even for my four-wheel-drive Wagon. We therefore needed an amphibious four-passenger all-terrain vehicle (ATV), to get through many mudholes and to ford the flooded streams. Enquiries suggested that the Argo ATV would fit the bill if one could be rented. A phone call to Adrian Fleury in Edmonton produced a list of Saskatchewan dealers and the pleasant news that the Saskatoon dealer, Saskatoon All-Terrain, would probably rent such a vehicle by the day. A phone call to this dealership brought a bright "Nice to hear from you, Dr. Houston" from manager Ron Herman, who was originally from Houston's home town of Yorkton. He rented us the Argo for a day and loaned us a trailer.

Early on 26 May the authors, with Mary Houston, left Saskatoon, picked up Finley in North Battleford, and Engele and his assistant Dale Wyatt at Meadow Lake. On the fire-guard east of Neeb we backed the Argo off the trailer and headed down the trail, convoyed by Engele and Wyatt on three-wheel ATVs. We picked up Garry Dyck at his cabin, bringing the party to seven.

When we approached the nest, we found the largest Great Gray Owl young perched on a horizontal branch about 12 feet above our heads and about 100 yards from the nest. The second bird was far out on a limb above the nest, which was 43 feet above the ground in the fork of a large aspen. The third nestling was still in the nest, which we believe from its size and construction was more likely the nest of a Goshawk than a Red-tailed Hawk. The nest tree itself was on dry ground and surrounded by other aspens. The nest tree thus was not in a tamarack swamp as is often the case, but nearby there was a tamarack swamp, a substantial meadow and a small lake, fulfilling the usual Great Gray requirements.[7]

Soon the smaller male adult came with a vole in his bill and transferred it to the female. She looked nervously at us and swallowed the vole herself. On the previous visit Engele had observed two such transfers, but in each case on receipt of the vole the female had fed it to one of the young.

After we caught, banded and replaced the oldest young on the horizontal branch, Wylie climbed the nest tree. Both remaining owls jumped from the tree and glided down to the ground more expertly than any Great Horned Owl at a similar stage of feathering (Figure 1). Meanwhile the female parent came and sat only four feet from the nest. The two young on the ground were then hoisted up to the nest in a backpack. We marvelled at the beauty of both adults and young, much darker than any Great Horned Owl, at their noiseless flight, and at their relative tameness.

Pellets collected from below the nest for analysis contained the following: 19 Meadow Voles (minimum number based on skulls), 9 Northern Bog Lemmings (minimum number based on lower jaws), 2 Gapper's Red-backed Voles (minimum number based on lower jaws) and 1 snail, probably swallowed by one of the voles, since it was too small for the owl to have ingested purposely, or perhaps even seen.

All told, we spent six hours in the Meadow Lake area, and four hours in travel each way. We arrived back in Saskatoon at 9:00 p.m., two hours too late for a scheduled banquet which we were told had been sumptuous. But we had banqueted at a different type of feast — our never-to-be forgotten first nest of a Great Gray Owl.

Acknowledgements

We wish to thank R.W. Nero for loaning K. Michael Collins' University of Manitoba thesis appendix, listing known North American breeding records of the Great Gray Owl, and Lloyd F. Kiff of the Western Foundation of Vertebrate Zoology in Los Angeles and John W. Fitzpatrick of the Field Museum in Chicago for additional nest record data.

Bob Finley, Garry Dyck, Dennis Engele and Ron Herman together made the banding trip possible. Hugh C. Smith, Curator of Mammalogy at the Alberta Provincial Museum in Edmonton, analysed the pellets for us.

[1] COLLINS, K.M. 1980. Aspects of the Biology of the Great Gray Owl. M. Sc. thesis, University of Manitoba, Winnipeg.

[2] FERRY, J.F. 1910. Birds observed in Saskatchewan during the summer of 1909. *Auk* 27: 185-204.

[3] HOUSTON, C.S. 1956. Great Gray Owl banded at Saskatoon. *Blue Jay* 14: 11.

[4] HOUSTON, C.S. 1957. The Great Gray Owl in Saskatchewan. *Blue Jay* 15: 150-153.

[5] HOUSTON, C.S. 1980. Early Quill Lake ornithologists. *Blue Jay* 38: 219-220.

[6] LAW, C. 1960. The Great Gray Owl of the woodlands. *Blue Jay* 18: 14-16.

[7] NERO, R.W. 1980. The Great Gray Owl. Washington: Smithsonian.

[8] SYMONS, R.D. 1967. Hours and the Birds — a Saskatchewan Record. Toronto: University of Toronto Press. p. 136.

Hunting birds often perch in deciduous trees in winter *Robert R. Taylor*

LEAVING THE NEST

A RARE GLIMPSE AT A PIVOTAL MOMENT IN THE LIFE OF A FAMILY OF GREAT GRAY OWLS

ROBERT W. NERO, 1495 St. James Street, Winnipeg, Manitoba. R3H 0W9

At 18 m above the ground, balanced on two long, sharp spurs jabbed into the rough bark of a tall, nearly limbless black poplar tree, I was scared. Sweating and trembling with fatigue, I kept muttering to myself, "Never again, never again!" This was higher than I had ever been on climbing irons before. The combination of inching my way up the slim tree, which was swaying in the breeze, and the long, hot day during which Herb Copland and I had driven more than 600 km from Winnipeg to Wabowden, Manitoba, brought me closer to the edge of exhaustion than I was willing to admit. It was about 6:00 p.m., 30 May 1981; we were at our second Great Gray Owl nest that afternoon, thanks to Dan Chranowski, Wildlife Technician from Thompson, who led us to the nests. So far, this is the farthest north in Manitoba that we have banded Great Gray Owls.

Great Gray Owls, like many other owls, nest in old stick nests built by hawks and ravens. They bring nothing to the nest, relying on whatever deserted or vacant structure they can find. Accordingly, they occupy nests at varying heights, from 7 to 16 m or more. This particular active nest had been discovered in late spring during logging operations. Now the young were large enough to band. The nest tree, actually the only whole standing tree for about 450 m around, had been left uncut at the order of Len Hercum, foreman of the logging operation. Black spruce, balsam fir and jack pine had been cut and hauled away for pulp, but trunks and branches of unwanted poplar trees littered the ground.

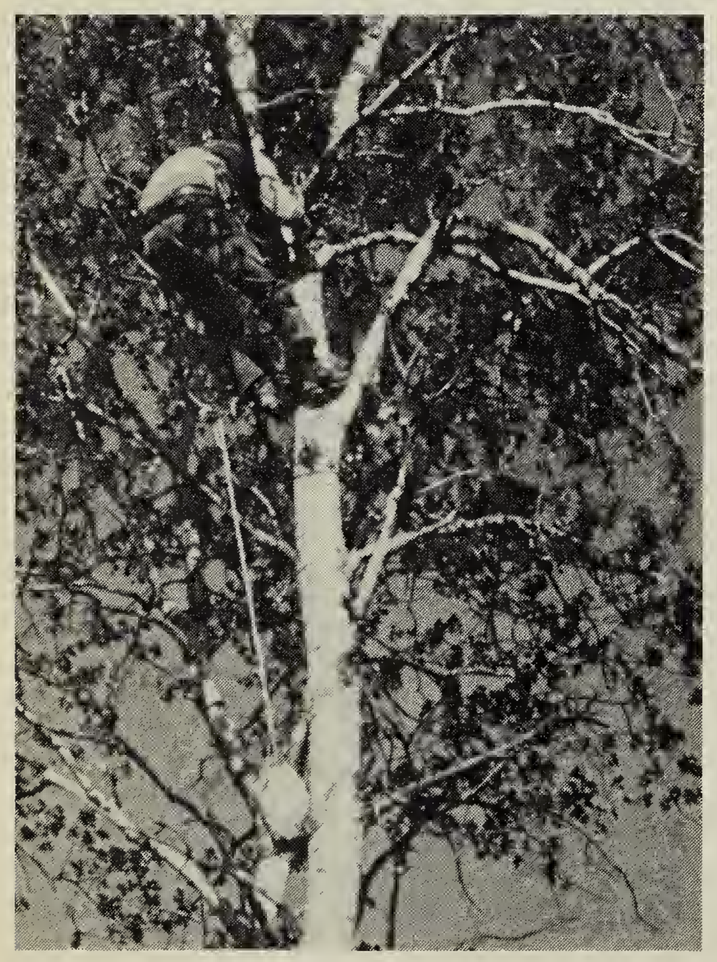
Nero climbing to nest

Dan Chranowski

This owl family had somehow adjusted to the noise and activity of men and machines while an entire forest was cut out from around them.

When we arrived at the nest tree, the female was perched nearby on the top of a tall, slender snag, watching anxiously as we made our preparations. We could see at least one young owl in the nest, but the male was nowhere in sight. We guessed that he was far away, hunting for voles and other small mammals to feed the growing owlets.

Leaning back into my safety belt, just below the large nest, which contained three partly-feathered young, I began to unwind the rope I had brought up with me so that the young could be lowered to the ground. Then I concentrated on the problem of getting first one and then a second struggling, hissing, bill-snapping owlet into a cloth bag. Suddenly there was a shout from below. As I looked up, the female flew in and perched on a small limb less than 1 m from me. She and I stared mutely at each other; seconds later she flew back to her original perch. Although relatively docile in the nest vicinity, compared to many other birds of prey, Great Gray Owls can be belligerent in defense of their young. It is the female that is the aggressor and one has to watch her closely, for she can be a dangerous foe. Usually we can tell from a bird's behaviour when it is getting ready to attack, and one person always is supposed to keep an eye on the female.



Lowering nestlings in bag

Dan Chranowski

When I straightened up to reach for the third young owl, I was surprised to find the nest empty. Without my knowing it, the third owlet had jumped out and fluttered safely down to the ground. My companions had assumed that I'd seen this happen and so hadn't said anything.

I lowered the bagged young to the ground, then started climbing down with some relief, knowing that since the young clearly were ready to leave the nest, I wouldn't have to climb back up to replace them. Ordinarily, Great Gray Owl nestlings leave the nest at 3 to 4 weeks of age. By the time they are this old they are belligerent nest mates, shoving and bill-snapping at each other. Rarely, a nestling may be forced out over the edge of the nest, but young at this age usually survive. In one case, at a nest east of Winnipeg, a young owl which fell to the ground from a nest about 14 m above ground, stayed at the base of the nest tree where it continued to be fed. It actually grew at a faster rate than did its nest mates.

Although young Great Gray Owls are unable to fly when they leave the nest, their flight feathers are partly grown and aid them in dropping safely on that first flight to the ground. This is one of the hazards facing a species that uses old nests sometimes located at a considerable height. The highest nest to come to my attention was one

Nero and Copland with young owls *Dan Chranowski*

at Pickle Lake, Ontario; it was slightly over 20 m above the ground. For young owls, that's a long way down. To avoid ground predators, the female leads the young away from the nest tree until they find a stump or leaning tree that they can climb to get above ground. The young owls have strong feet and are good climbers, ascending to considerable heights at this early age. Not only can they climb slanted trunks, but they can make their way up vertical trees, pulling themselves up over limbs by using their bill, head and neck, flapping their little wings for balance.

While the female watched closely from nearby perches, we banded the young owls. Then Herb stationed himself at a suitable poplar snag and I stood nearby, holding one young and teasing it until it hissed and bill-snapped, trying to bring the female in closer. Soon she landed on the top of the snag above Herb, whereupon he captured her by means of a 6-m fishing pole with a wire snare at the tip. Snaring doesn't hurt the owl as the heavy neck feathers ensure that the snare isn't drawn too tightly. We rarely catch the male, for he is shy and seldom comes close.

We held the female for about 20 minutes, recording a series of measurements including state of molt, weight and other traits. When released, she flew slowly to a low perch about 16 m from the nest tree. Obviously overheated and suffering slightly from stress, she sat panting, both wings spread out and drooping. This happens especially on warm days, but handling the female seems to have no lasting effect.

It was now about 45 minutes since we had arrived; we were standing 20 m from the nest tree watching the

Herb Copland about to snare female owl *Dan Chranowski*

Female owl banded and tagged *Dan Chranowski*

female on the left and the young to the right on low perches where I had placed them, preparing to pick up our gear and leave. At that moment, the male owl appeared at about 300 m away, beating rapidly towards the nest tree, wings bowed like a heron's. Of course, as far as the male was concerned the young were still in the nest, and he was coming to deliver a vole to the female on the edge of the nest. Because all the trees had been cut down, we were able to observe his flight from distant hunting grounds, something we'd not previously seen. Ordinarily he would have been making his way through heavy forest. The male's rate of speed and direct flight up to the edge of the nest was an exciting sight. When he landed on the edge of the nest above us, I said, "Don't move!", suddenly realizing that we were watching an extraordinary experimental situation. We were confronted with a circumstance that must have occurred often over thousands of years — that moment when, in the absence of the hunting male, the young have dropped to the ground and the female is no longer attentive to the nest. We watched the whole scene intently.

Perched on the edge of the nest, the male paused, obviously surprised by the lack of birds in or at the nest. I sensed his indecision and almost held my breath to see what he would do next. He swung his head sharply, first to one side and then the other, peering down into the empty nest, disturbed by a situation so different from his last visit. The male suddenly began calling, giving a double-noted *"ooh-ooh, ooh-ooh"*, repeated about 20 times. This is the male's anxiety call, often given when the female is disturbed and off the nest. Usually the call ceases the moment the female returns to the nest. But, up to now, neither the female nor the young had made any sound. The vole still dangl-

Male owl leaving for food Dan Chranowski

ing from his bill, the male next gave a series of strongly accented hooting notes, emphatic and demanding. At this, one of the young on a low perch gave a single food-begging call, a rasping, high-pitched *"sherr-rick!"* At once the male dropped off his high perch, adroitly angling down to the ground to land on a low limb about 3 m from the young which had called. The young bird repeated the begging call, and then hurried towards the male, making its way surprisingly quickly, hopping and stumbling over limbs, until it stood in front of the male. The male leaned forward and offered the vole to the owlet — but nothing happened! This was evidently too new for the owlet to apprehend; it was still used to being fed by the female. As long as the young are in the nest, the male (sole provider of food for the female and young) brings prey to the female who then feeds the young. Once the young are out of the nest, however, the male begins to feed the young directly, flying to each one in turn, wherever it may be perched, usually going to whichever one begs the loudest.

At this time the female, about 100 m away, still on her stump, gave a comfort shake, expanding all her body plumage, then heavily shaking her body and head — a sure sign that she had recovered from her over-anxious state. She then gave the female food-begging call, a louder and more strident version of the begging call of the young; this was followed by intensive begging, a rapid series of low, melodic notes related to a similar call given by excited young nestling owls, a kind of chirping. Almost with her first call, the male flew to her, landing on a fallen tree only 1 m away, the vole still in his bill. The female, chirping rapidly, edged towards her mate, her back feathers raised, head low, bill foremost. When she reached him, he bent towards her and she pulled the vole from his bill. With the food exchange made, the male at once flew off across the open site, heading back in the direction from which he had come.

The female held the vole for a few seconds, then, tilting her head back, with three gulping movements swallowed it, whereupon she seemed to gain new strength, standing upright with wings in place, a picture of relaxed comfort.

Marvellous! Not knowing what

would happen in these particular circumstances, and owing to the lack of any cover, we were able to observe the entire sequence of events. I was left with the feeling that we had shared a privileged opportunity to see in detail what happens when a hunting male returns with food and finds a portion of his world in upheaval. The nestlings, abruptly displaced and yet in a condition that they shortly faced in any case, and the female, temporarily exhausted and initially unwilling or unable to respond to the food-bearing male, kept the male in suspense for longer than is probably normal. But in the end, the adaptive behaviour of these birds provided a relatively smooth ending to an uncertain situation.

Although flightless when they leave the nest, young owls have strong feet and are good climbers *Dan Chranowski*

WINTER PREDATION ON AN ERMINE BY A GREAT GRAY OWL

DANIEL F. BRUNTON, 2704 Marie Street, Ottawa, Ontario, K2B 7E4 and
WILLIAM D. REYNOLDS, Box 453, Perth, Ontario. K7H 3G1

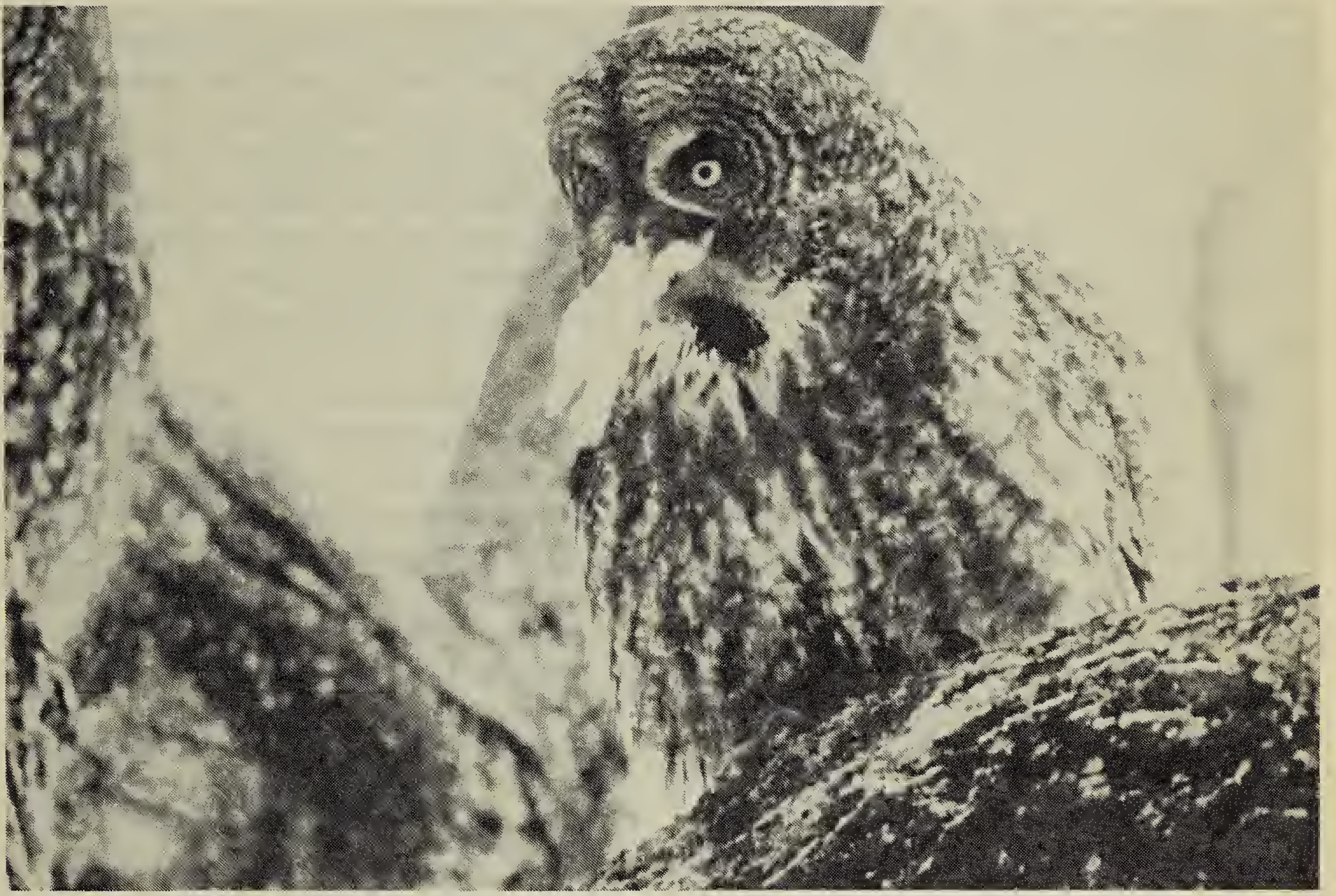


Figure 1. *Great Gray Owl swallowing hind portion of an Ermine, 11 January 1984, Nepean, Ontario* *W. Reynolds*

The Great Gray Owl is primarily a crepuscular predator of small rodents, with the Meadow Vole *(Microtus pennsylvanicus)* being by far the most common prey species.[6] Although other prey species have been noted — varying from dragonflies to Varying Hare — these are infrequent and of relatively little overall significance.[6] Brunton and Pittaway observed a Great Gray attempting to capture an apparently healthy Red Squirrel *(Tamiasciurus hudsonicus)* which it failed to do after a lengthy struggle.[2] We are aware of no observations of attacks on larger, healthy animals. Feeding on carrion — or on individuals severely weakened by disease or injury — may well account for the infrequent discovery of remains of larger prey in Great Gray Owl pellets and/or at nest sites.[2 4 6] The Great Gray, then, appears to be an opportunistic predator, feeding on any animal that it can subdue without excessive effort.

In the following, we document the predation by a Great Gray Owl on an Ermine *(Mustella erminea cicognanii)*, one of these larger, rarely detected prey species.

On 11 January 1984 Reynolds, with fellow photographers H. Danner and T. Dyke, observed and photographed an adult female Great Gray Owl which had been on territory at Shirleys Bay Hamlet, Nepean, Ontario (just west of Ottawa along the Ottawa River) for several weeks. (The sex of the bird, indicated by a wing length measurement of 430 mm, and age were determined by R. Poulin of the National Museum of Natural Sciences during banding activities). The owl was roosting in a tree with a dead Meadow Vole in the talons of one foot. At ca. 1000 h the bird observed an Ermine moving across the snow (which was ca. 0.5 m deep), flew directly to it, pounced on the weasel and apparently killed it. The Ermine was assumed to be killed immediately by the owl's talons because it did not move after capture nor did the bird lean over and bite its head as Great Grays usually do with mice and voles.[2] [6] Throughout the pursuit and capture, the dead vole remained in the owl's talons. Shortly thereafter, the owl flew to a large, horizontal tree limb with *both* prey in its talons where it remained for almost an hour, "brooding" the two prey and dozing in the bright morning sunshine. Occasionally the bird would become alert, look around and peck at the weasel but no attempt was made to feed on it. At about 1100 h the bird became fully alert, turned on its perch (dropping the vole in the process) and, holding the dead weasel in its talons, tore the prey in half with its bill. The fore portion of the weasel was subsequently swallowed whole, followed quickly by the hind portion (Figure 1). The viscera were not removed and the entire prey was swallowed. The breaking up and swallowing of the Ermine took ca. 30 seconds.

As the sex of the Ermine could not be determined, it is difficult to be precise about the weight of the prey. Males (ca. 80 gms) are much heavier than females (ca. 54 gms).[1] The Ermine gave no indication of weakness or abnormality (beyond that of venturing abroad in day time; it is primarily a nocturnal predator).[1] [7]

Although lighter in weight than a Red Squirrel, the Ermine is a surprising prey because it is itself a predator and predators are not commonly found to be prey species of owls.[3] Because of its aggressive manner, the Ermine would likely be a more difficult animal (gram for gram) for a Great Gray Owl to subdue than a Red Squirrel. This owl's success may have been largely dependent on its ability to kill the weasel immediately and without a struggle. If previous observations of attacks on Red Squirrel are any judge, we would expect the Ermine to escape from the owl if the struggle were prolonged.[2]

Although Nero lists "weasels" amongst the prey of Great Gray Owls, this is based on the discovery of Ermine remains in a single pellet found at a nest in early 1977 (R. Nero, pers. comm).[6] The possibility of this representing an owl's feeding on carrion cannot be eliminated and has been documented with Great Grays feeding on the carcasses of Marten *(Martes americana)*.[6] Mikkola lists Pygmy Weasel *(Mustella rixosa)* — a smaller species than Ermine — as a rare (0.8%) prey item at 61 European nests.[5]

S. Loch found a pregnant Least Weasel *(Mustella rixosa)* at a Great Gray Owl nest near Hadaskville, Manitoba on 1 May 1984 (R. Nero, pers. comm.).

Nero suggests that Great Grays probably require considerably more than their normal summer food consumption during the more demanding cold periods of winter.[6] This may encourage the owl to pursue larger prey items (such as the Ermine) at such times. It is interesting to note that the bird in these observations was already holding a prey item (presumably because it was "full" from several others it had caught and eaten prior to 1000 h) and maintained possession of it throughout the chase and capture of the larger prey. It may have been holding on to this vole (rather than storing it) to keep it from freezing. We have watched the bird chase and catch a frozen mouse used as a lure but, upon biting it, the owl would immediately fly off. By 'brooding' the prey, they would remain warm and flexible and in an edible form. As temperatures were between -23.2 C and -17.0 C that day (*fide* Transport Canada Weather Office, Uplands Airport, Ottawa), the prey would have frozen very quickly if exposed to the air. This not only would have made the prey very difficult (if not impossible) for the bird to tear up and eat, it would have used a considerable amount of the owl's core body heat to melt the frozen meat. That, in turn, might be a critical factor affecting a bird's survival during extended cold periods.

Our observations, then, appear to represent the first documented case of a Great Gray Owl being observed to kill and eat an apparently healthy weasel. This Ermine may also represent the largest prey animal actually seen to be killed by a Great Gray Owl.

Acknowledgements

Our sincere thanks to Bob Nero for providing useful information and important literature references on Great Gray Owls and to Richard Poulin for providing banding data on the bird in question. Thanks too to Helene Danner and Ted Dyke for their company and assistance in the field.

[1] BANFIELD, A.W.F. 1974. The Mammals of Canada. University of Toronto Press, Toronto.

[2] BRUNTON, D.F. and R.J. PITTAWAY. 1971. Observations of the Great Gray Owl on winter range. Canadian Field-Naturalist 85: 315-322.

[3] CRAIGHEAD, J.J. and F.C. CRAIGHEAD. 1969. Hawks, Owls and Wildlife. Dover Publications, New York.

[4] FISHER, B.M. 1975. Possible intra-specific killing by a Great Gray Owl. Canadian Field-Naturalist 89: 71-72.

[5] MIKKOLA, H. 1983. Owls of Europe. Buteo Press, Vermilion.

[6] NERO, R.W. 1980. The Great Gray Owl: Phantom of the Northern Forest. Smithsonian Inst. Press, Washington.

[7] PETERSON, R.L. 1966. The Mammals of Eastern Canada. Oxford Univ. Press, Toronto.

A NOTE ON ALBINISM IN THE GREAT GRAY OWL

RENATE SCRIVEN, 722 Buckingham Road, Winnipeg, Manitoba. R3R 1C2

In a mostly dark-plumaged bird such as the Great Gray Owl the occasional occurrence of white albinistic feathers should be expected and noticed. Lack of the pigment melanin in random feathers (partial albinism) has been reported for numerous species. Nero, for example, noted that practially all of more than 200 adult male Red-winged Blackbirds collected near Madison, Wisconsin, showed depigmentation of some otherwise usually wholly black feathers (Auk 71: 131-135, 1954). Although I made no attempt to search out the literature or to contact museums, albinism in the Great Gray Owl appears to be relatively uncommon. None of more than 150 Great Gray Owls banded in Minnesota by Steven L. Loch showed any albinism (pers. comm., 1984). In the process of lengthy handling of more than 300 live grown owls and about 80 dead ones, Herbert W.R. Copland and Robert W. Nero observed only five birds with abnormal white feathers. These Manitoba records are as follows:

An adult male specimen from Pinawa, 9 December 1979, had three white belly feathers and one white inner flank feather. An adult female captured at Lac du Bonnet, 8 December 1979, had a white section on one web at the tip of the third primary on the right wing. An adult female captured on 3 February 1980 near Elma had one main inner left scapular feather that was all white. This feature was first noticed in the field by John Christie who thought the bird had been marked after banding. An adult female captured on 1 June 1981 at Wabowden had two white feathers in the facial disk above the left eye and a few white feathers in the tertial area of one wing.

I was fortunate to be assisting Herb Copland and Bob Nero in banding owls at a nest near Marchand on 6 and 9 June 1984. The adult female at this nest had a tuft of more than 14 white feathers on the upper left side of the breast; these were concealed by the long breast feathers but were noticed while the bird was being inspected. Of greater interest was my discovery of an unpigmented and horn-coloured talon on the same toe of each of the three young from this nest. Neither the female nor the male parent showed any abnormal depigmentation of their talons. The occurrence of a common, specific albinistic feature, namely lack of pigment in the talon of the outer front toe on the right foot of each of three young in one nest, suggests a genetic aberration.

Kay McKeever, Owl Rehabilitation Research Foundation, Vineland, Ontario, has an adult male Great Gray Owl with one white undertail covert, and an adult female with a white scapular feather. In both cases, these single white feathers have been replaced annually for the past six years, indicating permanent follicle damage interfering with deposition of pigment (pers. comm., 1984).

I would like to thank Robert W. Nero for assisting me with the preparation of this note.

MANITOBA GREAT GRAY OWL RESEARCH PROJECT ANNOUNCED

MERLIN W. SHOESMITH, Chief, Biological Services, Manitoba Wildlife Branch, Box 14, 1495 St. James Street, Winnipeg, Manitoba R3H 0W9.

The most ambitious non-game research project yet undertaken under the auspices of the Manitoba Wildlife Branch was initiated in April 1984. This is a 4-year radio-telemetry study of the Great Gray Owl, designed to provide information on the movements of a known breeding population over a 4-year period. Use of habitat in all seasons and from year to year is expected to shed considerable light on the habitat requirements of this large raptor.

This project resulted from discussions between Bob Nero and Steven L. Loch, Foley Minnesota. As is generally known, Bob Nero and his colleagues (especially Herb Copland, Manitoba Museum of Man and Nature) have been studying the Great Gray Owl for more than 15 years. For the past 4.5 years, Loch has been using radio-telemetry to study Great Gray Owls in Minnesota under Professor Al Grewe, St. Cloud State University. In November 1983, Loch resigned from a full-time position with Minnesota Department of Natural Resources to take on the major role in the Manitoba project.

By 11 July 1984 there were radio-transmitters on 25 Great Gray Owls, including males, females and young, in an area about 50 miles southeast of Winnipeg. Loch plans to radio-mark an additional 5 young from this breeding population in the near future. The complement of 30 radio-marked owls will provide the basis for the 4-year study.

Maria Servos, a graduate student at the Natural Resources Institute, University of Manitoba, is already engaged in tracking the movements of four of these radio-marked owl families in relationship to their use of habitat. She is being assisted by Cheryl-Dawn Russell, a STEP student assigned to work on Great Gray Owls under the supervision of Bob Nero.

Sponsors of this unusual research project are:

- Manitoba Department of Natural Resources
- World Wildlife Fund Canada
- Murphy Foundation Ltd.
- Manitoba Naturalists Society
- Manitoba Wildlife Federation
- Lac du Bonnet Wildlife Association
- Selkirk Centennial School

Telemetry equipment has been supplied on loan from the U.S. Fish and Wildlife Service, the Canadian Wildlife Service and Ontario Ministry of Natural Resources. Except for Manitoba DNR funds, grants are being administered through the services of the Natural Resources Institute, University of Manitoba.

We are grateful to the officials of the above organizations for granting funds and loaning equipment in support of this project. Anyone wishing to contribute funds is welcome to do so. Funds should be sent to the "Great Gray Owl project" in care of Dr. Walter Henson, Director, Natural Resources Institute, University of Manitoba, 177 Dysart Road, Winnipeg, Manitoba R3T 2N6.

Herb Copland and Bob Nero with freshly captured owl *Norman R. Lightfoot*

NORTH DAKOTA OOLOGISTS*

MARC J. BECHARD, Department of Biology, Boise State University, Boise, Idaho, 83725 and C. STUART HOUSTON, 863 University Drive, Saskatoon, Saskatchewan. S7N 0J8

From the vantage point of nearly a century later, the activities of early oologists may appear scandalous. Critics might well claim that oologists contributed to the decline of at least one sought-after species, the Ferruginous Hawk. Nevertheless the early oology records allow us the best available understanding of the numbers and distribution of certain species near the turn of the century. Such information complements and augments the previously published records that have been so carefully collected and mapped by Robert E. Stewart.[27]

Our efforts have been concentrated chiefly, but not exclusively, on raptor distribution. Our best source of information has been the labels on data sets in many museums, particularly the Western Foundation of Vertebrate Zoology (WFVZ). We have augmented this by perusal of the published notes of a few ooologists, by contact with their few remaining relatives, and from state historical records and old newspapers.

North Dakota oologists are of special interest for a number of reasons. Some visited Canada and collected eggs in southern Manitoba and Saskatchewan.[3] Also, a portion of eastern North Dakota shares with Saskatchewan the same pot-hole - grassland ecology that even today supports one of the richest avifaunas, as exemplified by its persistence as the major area of waterfowl production in North America (Fig. 1).[8] Though eastern North Dakota and southern Manitoba were settled about 10 years earlier than southeastern Saskatchewan, these areas shared similar patterns of settlement and rapid conversion of grassland to grain production.

Many bird species had contended with human enemies even before the arrival of the white man. Dr. W.J. Hoffman, a surgeon with the United States Army at Grand River military post on the Missouri River immediately south of the present North Dakota boundary, who had looked forward to making an egg collection in the spring of 1873, tells how he was thwarted by the young Indians living on the surrounding Grand River Agency: "Few nests were found during my stay, and the scarcity no doubt depends upon the rascality of the young Sioux. These boys can be found at nearly all hours of the day, scouring the underbrush in all directions in search of eggs and birds. They are always armed with blunt arrows and bows, and know, too, how to use them effectually."[18] On his return from the Yellowstone Expedition, Hoffman spent September 1881 at Fort Berthold, about 75 miles northwest of Bismarck. Here the Indian boys "went out in small parties armed with bows and blunt arrows" to kill Vesper Sparrows. "They usually form a circle around the growth of weeds where the birds alight, gradually crawling in toward a common centre, firing at every specimen that may chance to fall within range. The number killed by any one individual is indicated by notches cut in the outer edge of the bow. The birds are secured by a string tied around the waist."[19]

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*Third in a series of articles on oologists of the northern great plains.

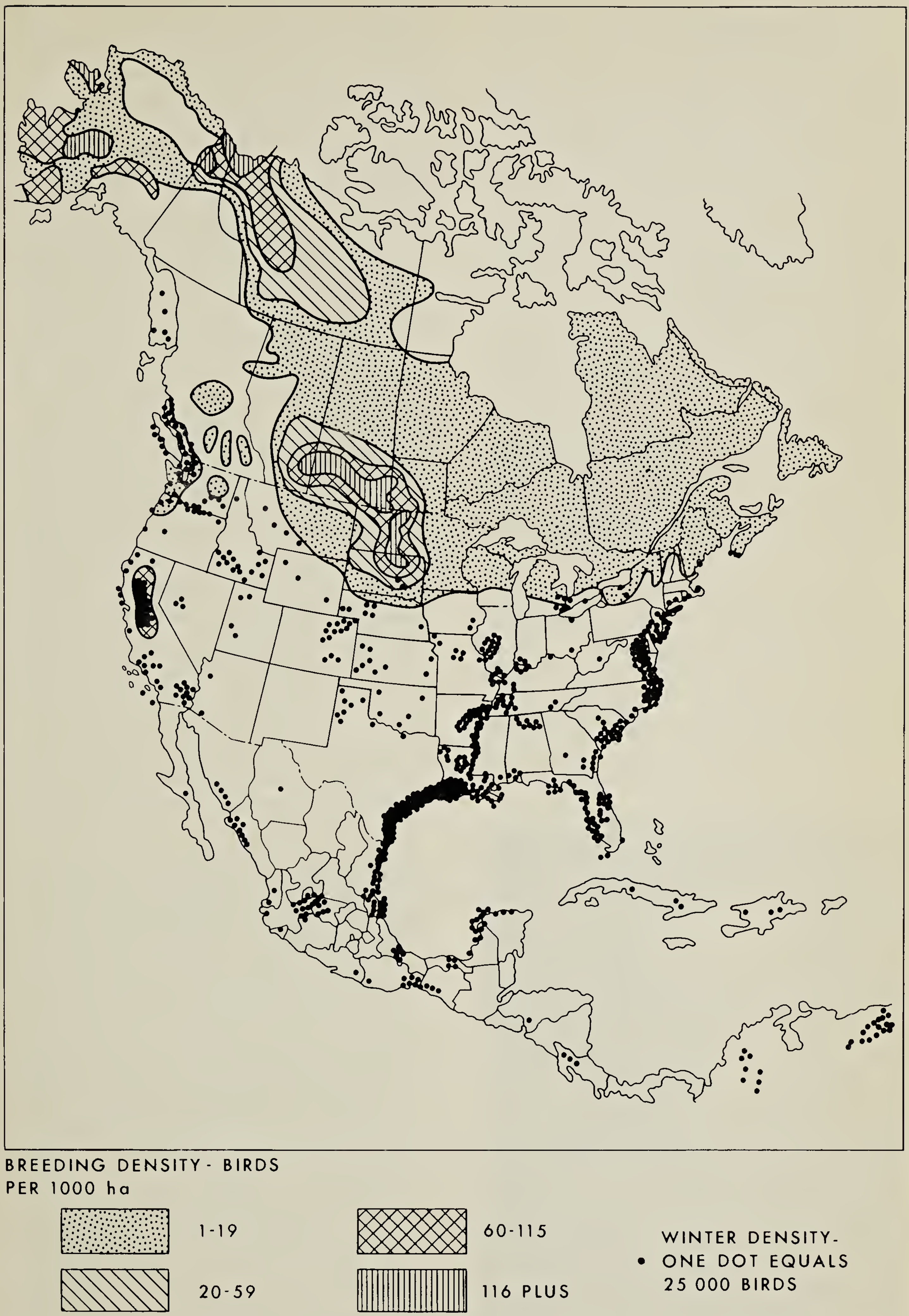

BREEDING DENSITY - BIRDS PER 1000 ha
1-19
20-59
60-115
116 PLUS
WINTER DENSITY-
• ONE DOT EQUALS 25 000 BIRDS

Figure 1. *Breeding density of ducks in terms of birds per 1000 hectares. The heaviest densities are in southern Saskatchewan and eastern North Dakota. From Boyd, H., 1983. Intensive regulation of duck hunting in North America, its purpose and achievements. Occasional paper #50, Canadian Wildlife Service.*

Perhaps the earliest field oologist in North Dakota was Captain Benjamn Franklin Goss, who collected in the Coteau Hills of northwestern North Dakota in 1880.[17] His observations on the nesting of the Swainson's and Ferruginous Hawks were quoted by Captain Bendire in 1892. Goss found four Ferruginous nests on hillsides, bulky and rather poorly finished, and constructed of bones, turf and dry grasses. Within the nests were bleached buffalo ribs, "all pointing to the center like the spokes of a wheel." Other bones in the same arrangement were found without any nest material; Goss believed that these represented locations where annual prairie fires had burned the sticks and grasses in the nest, leaving only the bones.[4]

Interest in oology in North Dakota centred on the Benson - Ramsay County areas around Devil's Lake, a town which was incorporated in 1887. The lake of the same name was in 1870, before settlement, part of a series of shallow, alkaline lakes which covered about 110 square miles.[2] [10] Here were the breeding grounds for myriads of waterfowl. In adjacent unbroken grassland, nests of Ferruginous and Swainson's Hawks were common.

The early collectors in the area, nearly all of whom had an interest in both taxidermy and oology, and who often collected the female from the nest for identification, included Gerard A. Abbott,[1] A.C. Bent,[5] Louis B. Bishop,[7] Edwin S. Bryant,[9] J.R. Craigue, Alfred H. Eastgate,[15] [16] Herbert K. Job,[20] Fred Maltby,[21] W. Mummery, P.B. Peabody,[22] Ernest S. Rolfe,[25] [25] Edward Stebbins,[12] and W. Snyder. Some came great distances: Bent and Job from Massachusetts, Bryant from Phoenix, New York, and Maltby from Kansas City. Even though the abundant birdlife made trips profitable, there were risks. William R. Brown from Wisconsin, for example, drowned while collecting at Sweetwater Lake, north of Devil's Lake, on 7 May 1895 (1894?), and only a bag of bird skins and an overturned boat led his three fellow collectors to his body.[9]

Eastgate first lived at Grand Forks, where he collected 640 eggs of 71 species in 1892, then travelled 100 miles on snowshoes to collect Great Horned Owl eggs in the early spring of 1893.[15] His marriage that Christmas did not restrict his activities; he took his bride on their delayed honeymoon from 3 May 1894, collecting eggs at Stump Lake, east of Devil's Lake, until 16 June when he injured his arm, quit collecting, and took up farming on the spot.[16] He continued taxidermy, and accompanied Louis B. Bishop to the Turtle Mountain in 1905,[7] and Bishop and A.C. Bent on their 1906 collecting trip to southwestern Saskatchewan. Eastgate's set of Ferruginous Hawk eggs taken on 3 May 1894 is in the WFVZ. In the same repository are 12 raptor sets collected in the Devil's Lake area: 3 of Swainson's Hawk taken by Mummery in 1895, and 9 sets of Swainson's and Ferruginous Hawk eggs taken by Bryant and Craigue in 1897.

Eugene S. Rolfe, an attorney at Minnewaukan, opened the first bank in Benson County in 1884 and was a member of the Constitutional Convention that wrote North Dakota's constitution in 1889. Although oology was only a hobby with him, he was the most energetic oologist of the Devil's Lake group. Among his 17 published notes are 3 that tell of his experiences finding raptor nests in the 1890s, documenting their rapid decline as land was ploughed. In 1896, Rolfe found 25 active Ferruginous nests with eggs within an area 40 miles long and 8 to 15 miles wide.[25] He also noted bleached buffalo ribs in most nests, even though the buffalo had disappeared more than 20 years earlier. Though most nests were on steep slopes, one was on top of a strawstack and another on the straw roof of an abandoned stable.

The next year he had one Ferruginous nest on a huge boulder in the center of what had been a buffalo wallow, and one nest on the ground on almost-level prairie.[26] Of 21 Ferruginous nests for which there are 1896-1901 data slips in WFVZ, only partially overlapping with the above account, 13 nests were on the ground on hillsides, 3 were on stony knobs or boulders, 1 on a haystack, and only 4 in trees (3 in Box Elders and 1 in an elm, none more than 11 feet above the ground).

By 1898, Rolfe noted that the Ferruginous Hawk had been pretty well driven away by the "rapid settlement of the country," and he was forced to move one county west (Pierce County) for 5 of his 9 nests in 1897-1900. Nevertheless, in his last year of serious collecting, 1901, he managed to take 9 Ferruginous sets within Benson County. Rolfe moved to Eugene, Oregon, in 1905 and died in Portland in 1934.

Benson County was also a favourite nesting site for rails. Fred Maltby was the fourth man in North America to find a nest of the Yellow Rail, and the first to find appreciable numbers of its nests. Maltby located 8 nests in the first 2 years, 1899 and 1900, though he trampled on 3 nests in the process.[21] P.B. Peabody came from Minnesota in following years, though only twice did Peabody find more than one Yellow Rail nest in a single year.[22] The results of the pioneer studies of these 2 men were quoted extensively by Bent.[6] In 1903, Maltby collected one Ferruginous egg set in Benson County and 3 in Pierce County; these proved, with one exception, to be the last in this once-ideal habitat through 1975.

As the Ferruginous Hawk virtually disappeared from the Devil's lake area, oologists devoted their attention to the "Mouse River loop" farther west and north. The oologists of Antler, a village of about 200 people, at the end of the railroad and less than 2 miles south of the Canadian boundary (not to be confused with the even smaller Antler in Saskatchewan, 40 miles to the north), amassed several of the largest and most representative raptor egg collections in North America.

J.D. Currie, another attorney, began the egg-collecting tradition in Antler as we know from his newspaper article in the 2 July 1905 *Antler American*. Currie warned farmers that their practice of shooting hawks could lead to the "disappearance of these beautiful and beneficial birds from the area." Currie argued that the harm caused, if such hawks should occasionally take a chicken, would be more than offset by the benefit gained from their control of ground squirrel numbers. In spite of this concern, Currie, like Rolfe, continued to collect birds' eggs and skins, collecting eggs from at least 7 Ferruginous nests in 1907 alone. He seems to have ceased collecting in 1908, and in 1911 he moved to Westhope, a larger town east of Antler.

Figure 2. *George L. Davy of Antler, N.D.*

David Ogg, a carpenter from Paisley, Ontario, settled in Antler in 1906. Most of his collection appears to have been destroyed or lost, although he was said to have the largest egg collection in North Dakota.[13] However, three of Ogg's Ferruginous egg sets, collected just across the border in Manitoba, represent the only fully documented nests, with locality and dates, available as evidence of past nesting of this species in Manitoba. David Ogg died on 18 October 1928 at the age of 62 years.[13]

Ogg instilled his interest in oology in his son-in-law George L. Davy, and in his friend George A. Withey. Jessie Ogg Davy was Antler's postmistress from 1919 to 1923, and her husband George was the mail clerk (Fig. 2). George Davy's interests are best known from the two short papers he published in *Oologist*, one of which dealt with his 1929 visits to Ferruginous nests within the Mouse River loop, formed by the incursion of the Souris River into the United States.[14] That year he collected 13 sets of Ferruginous eggs, left the eggs at 2 more nests, and found another 6 pairs which failed, 2 due to burning of the strawstack on which the nest was placed. In 1934, Davy was visited by a wealthy patent lawyer and oologist, P.B. Philipp from New York. With Davy's help, Philipp was able to collect 39 sets of eggs of 20 species, 10 of which were new to his extensive collection, in the last 8 days of May.[23] Philipp later donated his egg collection to the American Museum of Natural History, together with sufficient funds to allow the hiring of Dean Amadon, who developed into one of the world's foremost raptor biologists. During the last half of the 1930s, Davy worked as a railway mail clerk on the Antler-Rugby branch of the Great Northern Railroad, but collected no more eggs prior to his death in 1955 at age 75 years.

George A. Withey, a Canadian from Leamington, Ontario, was the engineer on the Antler-Rugby line of the Great Northern Railroad from 1904 until his retirement in 1931 (Figs. 3,4). Together with his sons, George C. Withey (Fig.

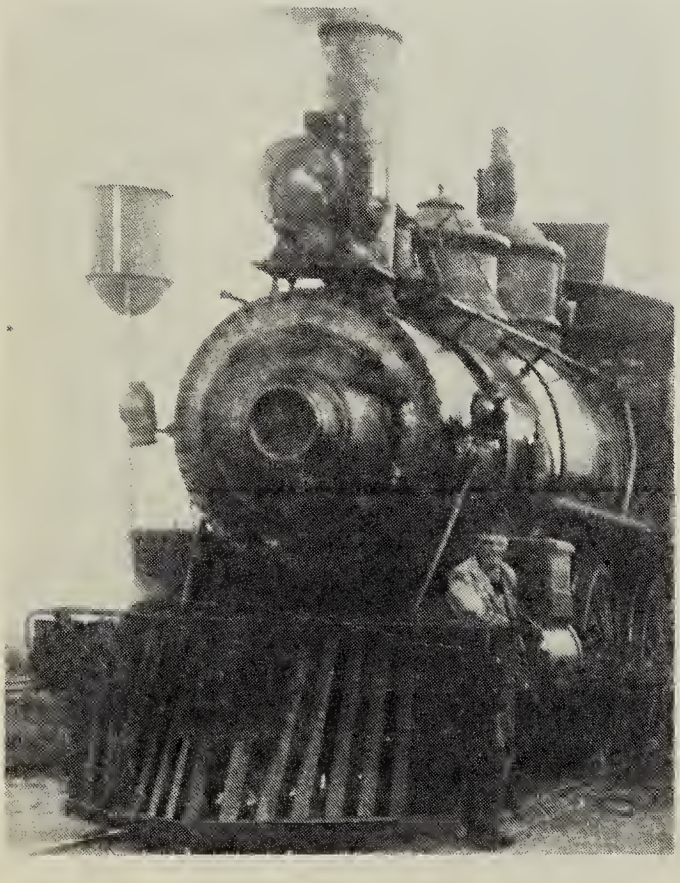


Figure 3. *George A. Withey with Great Northern engine #132.*

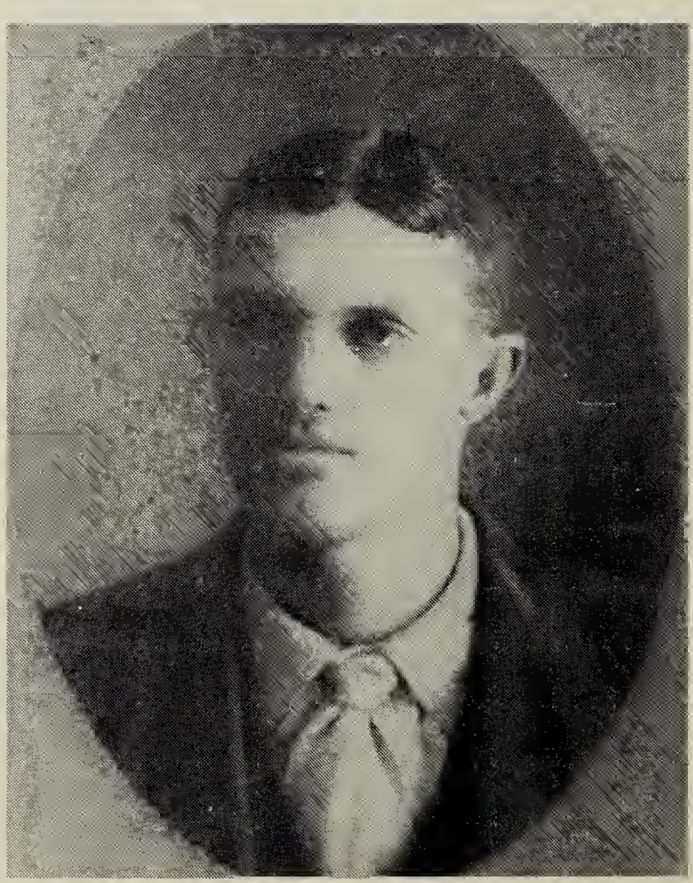


Figure 4. *George A. Withey in 1896.*

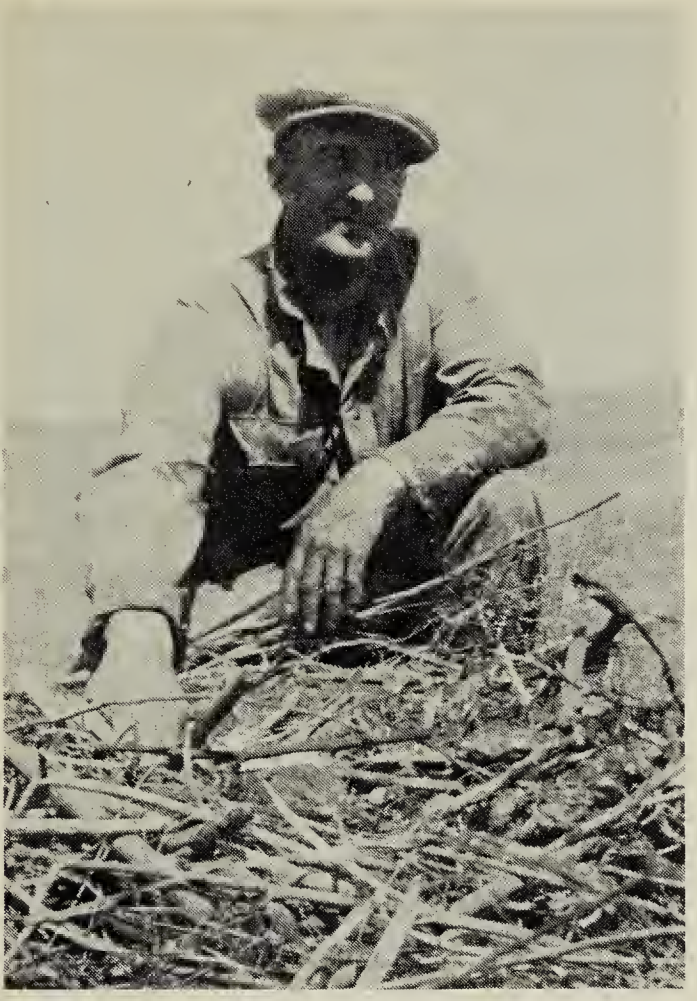


Figure 5. *George C. Withey with a Ferruginous Hawk nest on open, level prairie, 1937.*

5) and M. Everett Withey, he collected an estimated 6000 eggs in North Dakota, and was considered the dean of North Dakota oology. The Witheys made annual fishing and egging trips to the Moose Mountains of southeastern Saskatchewan and to the Turtle Mountains on the Manitoba - North Dakota boundary. Their Saskatchewan visits, sometimes via Sherwood and Northgate and sometimes via Gainsborough and Oxbow, resulted in the collection of 15 sets of Ferruginous Hawk eggs from a corner of Saskatchewan where the species no longer breeds. After his retirement, Withey travelled through the adjacent counties and added another 34 Ferruginous and 16 Swainson's sets to his collection, bringing the totals to 60 Ferruginous, 16 Swainson's and 14 Red-tailed Hawk sets. Through trade and purchase, his collection included eggs from other species throughout the United States and Europe. He did not publish, and only two of his letters have been located: one to J. Van Tyne at the University of Michigan, asking help in identification of a raptor skin from near Devil's Lake (it proved to be a Merlin, evidently rare there), and a letter to John R. Cruttenden, who ultimately bought most of the collection in 1945, just one year before Withey's death. Earlier, Withey had donated portions of his collection to various state colleges; for example, he gave 57 sets to Minot State College in 1934. The lion's share of the Withey collection has passed on from the Cruttenden and Byron Knoblock collections in Quincy, Illinois, to the WFVZ, but a few sets are in the American Museum of Natural History in New York, the University of Wisconsin at Green Bay, the Field Museum in Chicago and the Museum of Vertebrate Zoology at the University of California, Berkeley.

The other area of North Dakota with resident collectors who made important raptor egg collections was at Dickinson in Stark County. Edward Dodd, a taxidermist who came from England, and his sons Roy and Leonard, were serious collectors there between 1892 and 1910. Although only 15 sets of their raptor eggs have been located, these include the only five nesting records of the Peregrine Falcon for the country, with nests on a rocky butte face in 1898, 1899, 1901, 1902 and 1904. Only the 1901 record has been previously known.[24] Also in the WFVZ are Richardson's Merlin egg sets collected by the Dodds from a rocky butte in 1897 and from a clay butte in 1910; these appear to be the only known nesting records for Stark County. In addition to six Ferruginous sets, the Dodds labelled two other sets as those of "Rough-legged Hawks," almost certainly a misidentification of melanistic Swainson's Hawks (Bechard and Houston, Condor, in press).

Species such as the Ferruginous Hawk and Long-billed Curlew disappeared rather quickly as large tracts of grassland succumbed to the plough. In certain areas, this demise may have been accelerated by the activities of the many enthusiastic oologists who kept amassing larger and larger collections. As nests became scarcer, and as a hobby as destructive as oology became increasingly difficult to defend, egg collecting lost its popularity, but only after thousands of egg sets had been taken in North Dakota alone. Now only a few sets are taken by museums under rigid scientific permits; collecting by private individuals is no longer allowed.

The Western Foundation of Vertebrate Zoology in particular must be commended for gathering together, cataloguing and preserving many of the extant collections. These are a priceless research resource serving as a reference collection that allows measurement of parameters such as egg shell thickness before biocides of various types were developed and used. The data slips accompanying their egg sets offer valuable historical evidence as to distribution and even abundance of species near the turn of the century. Nowhere outside of North Dakota, for example, have we better documentation of the initial abundance of the Ferruginous Hawk, the nature of its nests, and the chronology of its decline.

Acknowledgements

Our greatest debt is to Lloyd Kiff and Raymond Quigley of the Western Foundation of Vertebrate Zoology, for access to nest data and for photographs, addresses, and "leads" to relatives of the oologists. Janet Hinshaw of the Museum of Zoology, University of Michigan, Ann Arbor; John Bull of the American Museum of Natural History, New York; Janice Hall of the Putman Museum, Davenport, Iowa; Richard B. Stiehl of the University of Wisconsin, Green Bay; Raymond A. Paynter, Jr., of the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; David Willard of the Field Museum of Natural History, Chicago, Illinois; and Eric N. Clausen of Minot State College, Minot, North Dakota, each provided data from their respective egg collections.

Jerome E. Withey of Whitefish, Montana, provided information about and photographs of his father, George A. Withey and of his brother, George C. Withey. Esther (Davy) Amundson of Bellingham, Washington, provided information about and photographs of her father, George L. Davy. Mrs. Leslie Welter, Jr., of Moorhead, Minnesota, Richard L. Plunkett of the National Audubon Society, New York, and Kenneth Mann of Dickinson, North Dakota gave information on the Dodd family. Forrest Daniel and Jim Davis of the State Historical Society of North Dakota provided census records, obituaries, and microfilm copies of early issues of the *Antler American* and *Westhope Standard.*

Morlan Nelson of Boise, Idaho led us to information on the initial size of Devil's Lake. Robert E. Stewart of Jamestown, North Dakota, read the manuscript for possible errors or misinterpretations. J.B. Gollop of Saskatoon and Margaret Belcher of Regina offered constructive criticism.

Hugh Boyd of Ottawa kindly gave permission to use Figure 1 from his recent publication.

We wish to extend our thanks to all of the above.

[1] ABBOTT, G.A. 1901. A grebe colony. Bird-Lore 3:86-87.

[2] BAILEY, V. 1926. A Biological Survey of North Dakota. I. Physiography and Life Zones. II. The Mammals. N.A. Fauna No. 49. Washington.

[3] BECHARD, M.J. Historical nest records for the Ferruginous Hawk in Manitoba. Can. Field-Nat. 95:467-468.

[4] BENDIRE, C. 1892. Life Histories of North American Birds. Smithsonian Contributions to Knowledge #28. Washington: Smithsonian Institution. 446 pp.

[5] BENT, A.C. 1903. A North Dakota slough. Bird-Lore 5:146-151.

[6] BENT, A.C. 1926. North American Marsh Birds. USNM Bull. 135. 490 pp.

[7] BISHOP, L.B. 1935. A day in North Dakota. Oologist 52:89-95.

[8] BOYD, H. 1983. Intensive regulation of duck hunting in North America: its purpose and achievements. Occasional Paper #50, Canadian Wildlife Service. 24 pp.

[9] BRYANT, E.S. 1895. Drowned in Sweetwater Lake. Nidiologist 2:144.

[10] BUE, C.D. 1963. Principal lakes of the United States. U.S. Geological Survey circular # 476. 22 pp.

[11] COON, F.T. 1889. The American Goldeneye. Osprey 3:132.

[12] DAVIE, O. 1889. Nests and Eggs of North American Birds. Columbus: Hann & Adair. 455 pp.

[13] [DAVY, G.L.] 1929. David Ogg. Oologist 36:27.

[14] DAVY, G.L. 1930. Nesting of the Ferruginous Roughleg Hawk in northern North Dakota. Oologist 47:14-18.

[15] EASTGATE, A.H. 1893. [Letter to the editor]. Ornithologist and Oologist 18:143.

[16] EASTGATE, A.H. 1895. My honeymoon. The Museum 1:121.

[17] GOSS, B.F. 1883. Breeding habits of the Carolina and American Eared Grebes. Ornithologist and Oologist 8:1-2.

[18] HOFFMAN, W.J. 1875. List of birds observed at Grand River Agency, Dakota Ter., from October 7th, 1872, to June 7th, 1873. Proc. Boston Natural History Soc. 18:169-175.

[19] HOFFMAN, W.J. 1882. List of birds observed at Ft. Berthold, D.T., during the month of September, 1881. Proc. Boston Natural History Soc. 21:397-405.

[20] JOB, H.K. 1898. The enchanted isles. Osprey 3:37-41.

[21] MALTBY, F. 1915. Nesting of the Yellow Rail in North Dakota. Oologist 32:122-124.

[22] PEABODY, P.B. 1922. Haunts and breeding habits of the Yellow Rail. Journal Museum of Comparative Oology 2(3-4):33-44.

[23] PHILLIP, F.B. 1935. Afield in North Dakota. Oologist 52:79-83, 114-118, 125-130 and 134-136.

[24] REED, C.A. 1904. North American Birds Eggs. New York: Doubleday, Page. 356 pp.

[25] ROLFE, E.S. 1896. Nesting of the Ferruginous Rough-leg. Osprey 1:8-10.

[26] ROLFE, E.S. 1898. Notes from the Devil's Lake region. Osprey 2:125-128.

[27] STEWART, R.E. 1975. Breeding Birds of North Dakota. Fargo: Tri-College Center for Environmental Studies. 295 pp.

Old Ferruginous Hawk nest, Rockglen Valley. *Chris Adam*

RAPTOR MORTALITY ON NORTHEASTERN BRITISH COLUMBIA TRAPLINE

CHRIS SIDDLE, 8927 116th Avenue, Fort St. John, British Columbia. V1J 2Y2

In *The Great Gray Owl*, Robert Nero speculated that traps set for furbearing animals must kill many owls and that "in view of the number of trappers working with the range of the Great Gray Owl, trapping may be a mortality factor of considerable significance".[1]

Some recent experiences that I have had in the Fort. St. John area of northeastern British Columbia cause me to agree with Nero and, in fact, wonder if perhaps trapping might be not only a significant mortality factor, but also a particularly pernicious and often overlooked one.

Over the past four winters I have been allowed to view some (but not all) of the birds, mostly raptors, accidentally killed in the 350 traps of a single trapper who maintains two short traplines, one about 50 km west of Fort St. John and the other about 100 km north of the city.

From late 1980 to March 1984, his two lines have accounted for the deaths of two Boreal Owls, four Great Horned Owls, one Great Gray Owl, one Barred Owl, three Northern Goshawks and several Gray Jays.

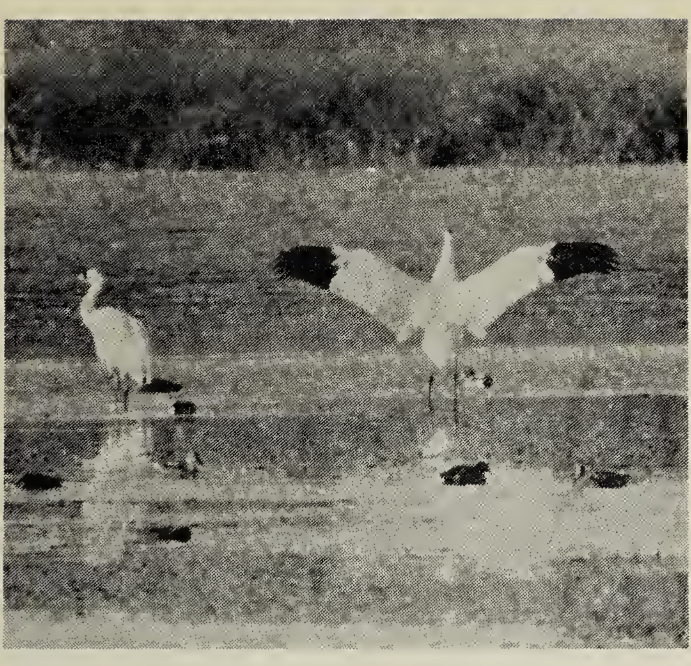
The first Boreal Owl, killed during the winter of 1980-81 north of Farrell Creek, had the back of its skull crushed. The second Boreal Owl was caught across its left side in a lynx trap on 27 February 1984, at the confluence of Black Creek and the Beatton River. The Great Gray Owl was found frozen, with wings outstretched, both feet caught in a leghold trap, in early January 1982. The Barred Owl had its chest crushed in a trap sometime in February 1981. Both of these birds were killed north of Farrell Creek.

Boreal Owl *Chris Rees*

The trapper has mentioned that there have been other raptors killed that I have not been shown or told of.

Thus for two traplines in four winters a minimum of eleven owls and hawks of five species have been accidentally killed. In view of the fact that trapping remains a common practice in northern and central Canada, the effects of accidental trapline mortality on raptor populations remains virtually unstudied but deserving of attention.

[1] NERO, R.W. 1980. The Great Gray Owl: Phantom of the Northern Forest. Smithsonian Inst. Press, Washington, D.C.



Whooping Cranes *Gary W. Seib*

WHOOPING CRANE TOUR

One-day nature tours to observe migrating Whooping Cranes will depart from Saskatoon on 29 September and 6 October 1984. The tours will be led by Natural History Society members and will begin about 0830 h and continue until dusk. Tour cost ($65) covers leadership and transportation from Saskatoon. For further information, phone 343-1148 or 955-3242. To register, write: *SNHS, Box 1784, Saskatoon, Saskatchewan. S7K 3S1*

THIRTEEN-LINED GROUND SQUIRREL APPARENTLY FEEDS ON CREEPING JUNIPER SEEDS

GORDON HART, 145 Barrington Avenue, Winnipeg, Manitoba. R2M 2A8

The Biddulph half-section is a natural research area south of Saskatoon, belonging to the University of Saskatchewan. On 4 November 1982, I was there collecting cones of the Creeping Juniper (*Juniperus horizontalis* Moench). Creeping Juniper dominates the slopes of dry sand hills there, which are otherwise largely barren. On the ground near the juniper shrubs, I noticed several small mounds of crushed cones. These were evident due to their vivid colours; the cones are dark blue with a whitish bloom on the outside, and bright green inside. Closer inspection showed that there were no seeds among the cone

Midden of Creeping Juniper cones
Gordon Hart

litter, just seed coat fragments. Evidence suggests that the seeds had been collected and eaten by a Thirteen-lined Ground Squirrel *(Spermophilus tridecemlineatus).*

A juniper cone is more properly called a *galbulus* (pl. *galbuli)*, which means a cone with fleshy cone-scales.[5] It is not a berry, but is used like a berry by some animals seeking food, and indeed looks like a berry. Each galbulus of this species contains an average of three or four large seeds.

The galbuli at Biddulph had been peeled open. The seeds were removed, then cracked to expose the soft embryo inside. The embryo was the only part eaten. All other parts were discarded. This immediately rules out the possibility of birds having fed upon these galbuli. No birds known to feed on these species — such as Sharp-tailed Grouse[4] — hoard seeds, and most song birds feeding on juniper can only digest the soft pulp and not the seeds themselves.[2]

Since the cones had been hoarded, rodents were the logical suspects. Several rodents have been known to feed upon juniper fruit.[1] [2] Habitat perferences of species can reduce the choice still further. For example, the grass cover preferred by microtine voles was lacking in the sand hills at Biddulph.[3] The decision as to which rodent had been feeding on the seeds was finally reduced to a choice between ground squirrels or Deer Mice.

A Thirteen-lined Ground Squirrel is presumed to be the animal that left the mound of crushed cones. Near a cluster of the mounds, a den entrance was found with an inside diameter of about 3.5 cm. This is a rather large den size for a Deer Mouse to maintain, so it can be safely discounted as a possibility. Also, the only ground squirrel small enough to make a den this size is the Thirteen-lined. This species is also known to be a great seed-eater (thus the Latin name — *Spermophilus).*

The Thirteen-lined Ground Squirrel has not previously been recorded eating juniper seeds. This is also rather late in the year for a ground squirrel to be out feeding. Normally, they begin hibernation no later than October.[3] In 1982, the regional weather was still quite warm until the beginning of November, and may have allowed the ground squirrels to be active later than normal. Ripe juniper galbuli are available throughout the year, but this indicates their use by the ground squirrel in late autumn.

I would like to thank Dr. J.S. Rowe for making the trips to Biddulph possible, and Dr. R.J. Staniforth for reviewing this note.

[1] CRIDDLE, S. 1926. The habits of *Microtus minor* in Manitoba. Journal of Mammalogy 7: 193-200.

[2] MARTIN, A.C., ZIM, H.S., and NELSON, A.L. 1961. American Wildlife and Plants — A Guide to Wildlife Food Habits. General Publishing Company, Ltd., Don Mills, Toronto, Ontario.

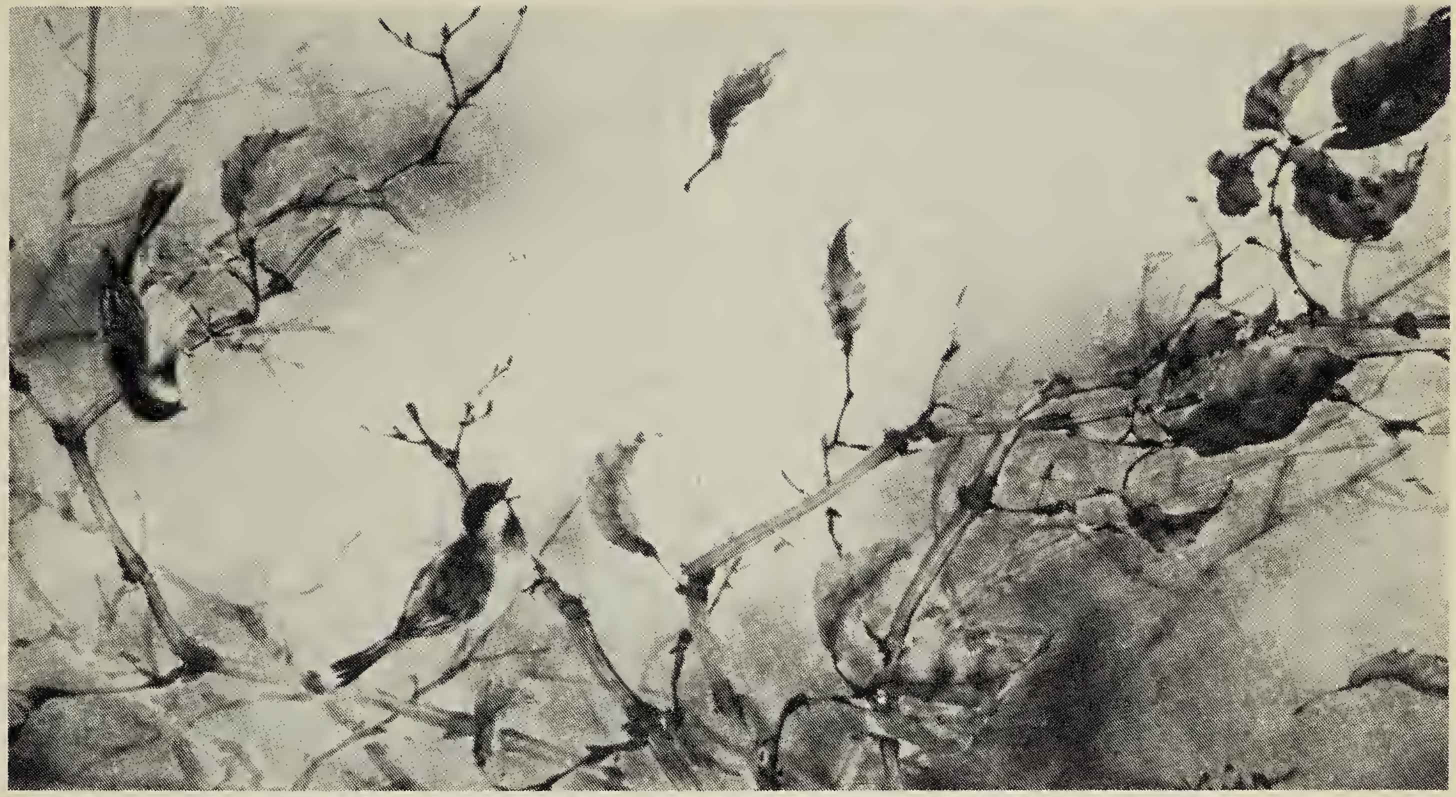
[3] SAVAGE, A. and SAVAGE, C. 1981. Wild Mammals of Western Canada. Western Producer Prairie Books, Saskatoon, Sask.

[4] SNYDER, L.L. 1935. A study of the Sharp-tailed Grouse. Contributions of the Royal Ontario Museum of Zoology 6. 66 pp.

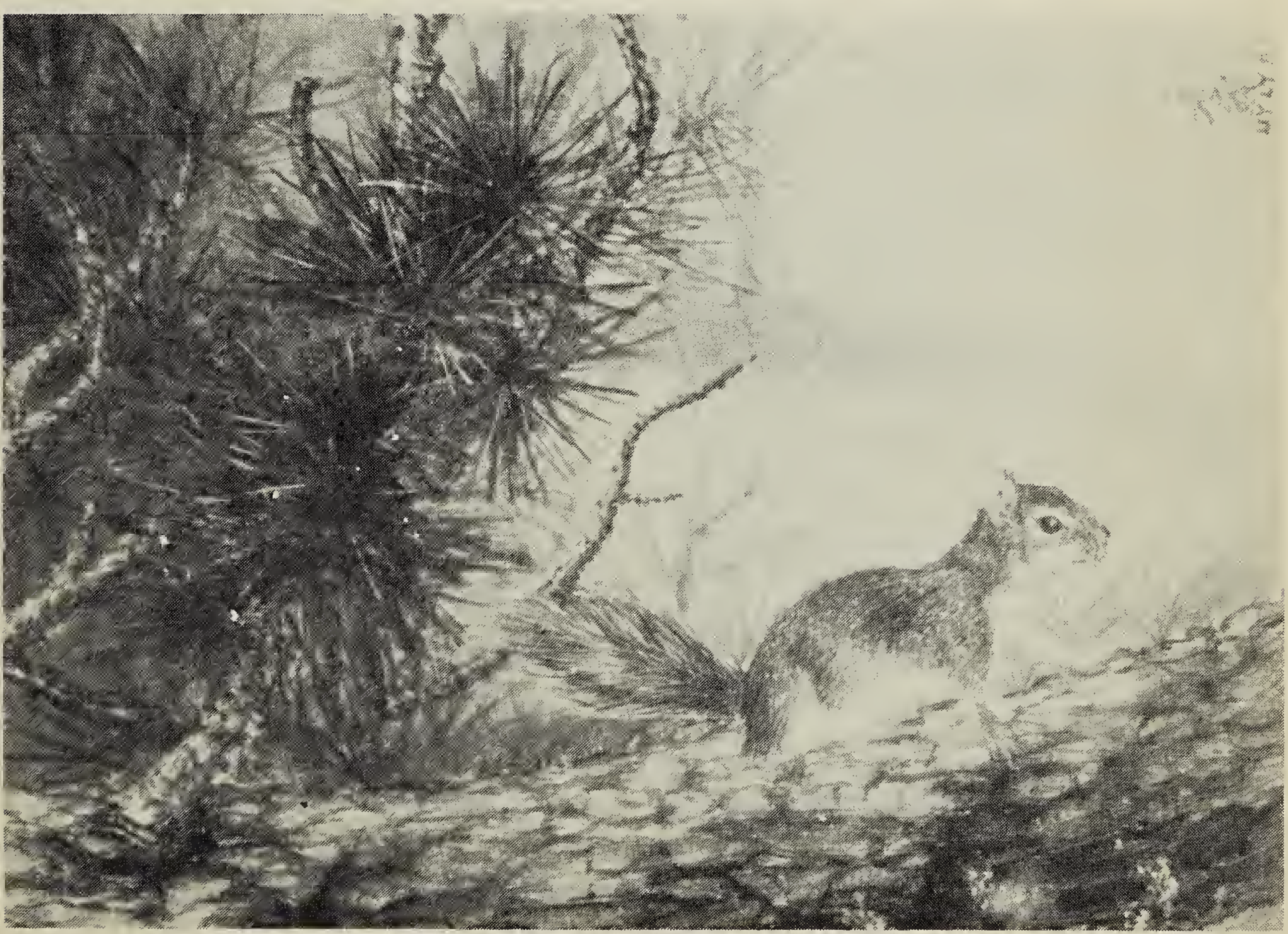
[5] USHER, G. 1966. A Dictionary of Botany. Constable and Company, Ltd., London.

WILDLIFE ART

UY LY, 3614 Dewdney Avenue, Regina, Saskatchewan. S4T 0Z5



Black-capped Chickadee.



Red Squirrel.

NATURE LIBRARY

WHIP THREE BEER

This is an unsung appreciation of Robbins, Bruun and Zim *Birds of North America*. The recent reviews in the *Blue Jay* (Vol. 42: 3-13) of bird identification books by some of Saskatchewan's best-known ornithologists provided some helpful points for birders in deciding which one of several guides would best serve their purposes. It seems that the National Geographic is the most popular. As a casual birder, I would like to bring attention to a major and unique feature of the Robbins' *Birds of North America* guide that I feel makes it (along with other attributes) an outstanding guide book among the four that were reviewed. It is the depiction of bird songs in the form of sonagrams that makes the Robbins' guide particularly useful but which has been given short shrift by the reviewers. One reviewer excuses the sonagrams as "an interesting feature, for those who can read them". Perhaps this oversight is a bias created by too much dependence on open spaces in which to casually view birds but thinking of the Spragues Pipit I tend to discount this.

I suspect that, as with me, many amateur birders are drawn to the study of birds by their songs or calls. As a 'flatlander' on my first vacation to the northwoods of Saskatchewan, I still recall well my encounter with Poor Sam Peabody; it remained indelibly etched in my memory as a sense of the north woods although I never discovered its source until a long time afterward White-throated Sparrow).

Last week while hiking in a strange (to me) habitat of semi-open woodlands in British Columbia my acoustic senses connected me with a song that I had heard in similarly structured habitat in the Mackenzie River valley of the Northwest Territories. The two habitats were linked by a common acoustic element. The elements of the song were clear and unmistakable — *whip-three-beer* — although each song, a thousand miles apart, had its distinctive characteristics or dialect. I knew vaguely that the source was some nondescript flycatcher or vireo sitting somewhere in the tree tops but as a casual (lazy) birder I'm not often inclined to chase down the source, especially in heavy undergrowth. However, upon returning home I was able to verify to my satisfaction that the song was that of the 'Whip-Three-Beer' Flycatcher (Olive-sided to the die-hard birder), distinctly illustrated in the sonagram on page 202 of the old (reliable) *Birds of North America*.

I, too, have shared the intimidation imposed by the unfamiliar format of sonagrams but with a little attention and practice, the sonagrams open up a whole new challenge to our acoustic senses. Sonagrams are the only way of converting the acoustic signal into a comprehensible format (one step above Whip-Three-Beer) for visual inspection and verification. They are a valuable tool for identification and study of birds and their use should be encouraged. Robbins' provide a concise and comprehensible introduction to the use of sonagrams and several clear examples of songs that we can relate to. My only complaint with the guide is that the

Sprague's Pipit has still not received its proper due as the acoustic sense of the true prairie. After all, the British have their Skylark.
— *K. Finley*, Box 8, Luseland, Saskatchewan. S0L 2A0.

Editor's Note: The best guide to bird songs is a record or tape, many of which are available. Perhaps the best book guide is *North American bird songs — a world of music* by Poul Bondesen, 1977, Scandinavian Science Press, Klampenborg, Denmark. 254 pp. It describes the songs of more than 300 passerines arranged in the format of a key and has 225 sonagrams, each much larger than in Robbins' guide. Each song is described (1) in technical terms, e.g., staccato, crescendo, stroke-figures, etc. (with a glossary); (2) in terms such as whistled and buzzy and (3) with the catchphrases attached to many songs, e.g., "Oh, sweet Canada, Canada, Canada" and "Quick — three beers". Included is a list of more than 80 records of North American bird songs. The book is available from the Blue Jay Bookshop for about $23.00 paperback.

GUIDE DES OISEAUX D'AMÉRIQUE DU NORD

CHANDLER S. ROBBINS, BERTEL BRUUN and HERBERT S. ZIM. 1980. Translation Michel Desfrayes and Françoise Labelle-Broquet. Editions Marcel Broquet. LaPrairie, Québec. 351+ pp. 172 plates, maps facing; paper, $16.50.

GUIDE DES OISEAUX DE L'AMÉRIQUE DU NORD À L'EST DES ROCHEUSES

ROGER TORY PETERSON. 1984. Trans. Philippe Blain, André Cyr, Normand David, Michel Gosselin. Editions France-Amérique, Montréal. 384+ pp. 136 pages of plates, maps follow text; paper, $17.95.

Here is your chance to bird-watch in French/Observer et identifier les oiseaux en français. These excellent French translations of the familiar Peterson (1980) and Robbins (1966) field guides are more or less verbatim, equally high quality versions of the originals (see reviews, *Blue Jay* 42: 3-13, 1984). Slightly smaller type and less white space make up for the somewhat wordier French text. Scientific, English and French names are given. The latter vary slightly in the two books. Peterson's guide uses the French names proposed by Ouellet and Gosselin (les noms français des oiseaux d'Amérique du Nord. Syllogeus no. 43. Musée national des sciences naturelles du Canada. Ottawa. 1983) and Robbins' those set out by the Canadian Wildlife Service [publication hors-série no. 2 (1972) and no. 1 (1978)] and modified in 1980 by a committee of the Quebec Zoological Society. Both books supply European French names where they differ from the Canadian for holarctic species. Both are available from the Blue Jay Bookshop.

— Reviewed by *Mary D. Gilliland*, 902 University Drive, Saskatoon, Saskatchewan S7N 0K1.

Canada Geese *G.L. Holroyd*

THE MANTARIO HIKING TRAIL — WHITESHELL PROVINCIAL PARK

MANITOBA DEPARTMENT OF NATURAL RESOURCES, Parks Branch, Winnipeg, Manitoba. February 1983. Paper $2.00.

Backpackers seeking new wilderness adventures within the prairie provinces will be excited to learn of the Mantario Hiking Trail. Located in Manitoba's first designated wilderness zone the Mantario Trail stretches across over 60 km of rugged Precambrian rock and forest.

Construction of the trail was funded through the Federal Local Initiatives Program with the co-operation of the Manitoba Naturalists Society and the Manitoba Parks Branch. Part of the project entailed the completion of this brochure. The brochure provides hikers with essential information and helpful hints including a 1:50,000 map of the route, a description of the trail, a backpacker's checklist, safety information and a brief description of the flora and fauna to be found along the trail. The brochure is made from Tyvek, a rip and water resistant material ideal for exposure to the elements.

The trail is recommended for experienced hikers only as it crosses a variety of terrains which are in a constant state of change throughout the seasons. The rewards of the trail's challenges are many, including the opportunity to experience the wilderness of the Manitoba Canadian Shield, to explore Jack Pine forests, hike through an aspen and Balsam Fir forest or observe a Bald Eagle, Moose or one of the many wildlife species in the area. — Reviewed by *Lin Gallagher,* Saskatchewan Parks and Renewable Resources, 3211 Albert Street, Regina, Saskatchewan. S4S 5W6

SOCIETY NEWS

CORPORATE DONOR PROGRAM

Recently the Executive of the Saskatchewan Natural History Society has established a Corporate Donor Program. The purpose of this program is to encourage donations to our Conservation Fund from the business community. These donations will be used to support the various conservation programs of the society including the Heritage Marshes Program and the Big Gully Creek Sanctuary.

We require the assistance of our members in making this program known to businesses in their area. Further information is available by writing to SNHS, Box 1784, Saskatoon, Saskatchewan. S7K 3S1

The Society wishes to acknowledge a donation of $500 from the Saskatchewan Mining Development Corporation.

36TH ANNUAL MEETING

Saskatchewan Natural History Society

October 26 to October 28, 1984 at
Melfort Heritage Inn
Melfort, Saskatchewan

October 26:
Registration and slides, 7:00-10:00 p.m.

October 27:
Registration 8:00 a.m.
Business meeting & program 8:30 a.m.
Banquet 6:30 p.m.
Dance 9:00 p.m.

October 28:
Tours — Waterhen Marsh
— Eagle Lake
— Fort à la Corne

MEMBERSHIP APPLICATION AND GIFT FORM

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City/Town .... Prov. .... Postal Code ....

Type of Membership (please check)

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Junior — Canada ($8) ....☐
Sustaining ($25) ....☐
Patron ($50) ....☐
Life ($500) ....☐

Regular — outside Canada ($15) ...☐
Senior Citizen — Canada ($10) ....☐
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- ★ Any amount in excess of the regular membership rate of $12.00 is viewed as *donation* for Income Tax purposes, and a receipt for the excess amount will be mailed to you if you check in the space above (minimum $10.00).
- ★ **Bulk subscriptions** to schools and clubs is $12.00 for the first subscription, and $10.00 for each additional subscription to the same address (minimum of 5 subscriptions).

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Box 1784, Saskatoon, Saskatchewan S7K 3S1

All cheques and money orders should be payable to SNHS.

★ Do you know of any person interested in natural history and conservation who does not receive the *Blue Jay*? If you do, please send name and address, and we will send a sample *Blue Jay* and an invitation to join our Society.

1985 — CALENDARS AND WEEKLY DIARY — 1985

CANADIAN NATURE 1985 Wall Calendar, 24 pp. 13¼ x 11, $8.95. SNHS members pay $8.05 and Sask. SNHS members add 40¢ tax — $8.45. 12, 4-colour photos of animals, birds, flowers and landscapes by some of Canada's foremost nature photographers. Camera and film details included with each picture.

CANADIAN WILDFLOWERS 1985 Weekly Engagement Diary, 128 pp. 8 x 5, $8.95. SNHS members pay $8.05 and Sask. SNHS members add 40¢ tax — $8.45. 53, 4-colour photos; boxed. Introduction and photography discussion by Mary W. Ferguson, FPSA.

CHRISTMAS CARDS

BOREAL CHICKADEE in full colour by Stan Shadick. **FRITILLARY ON ARNICA** in full colour by Jim Jowsey. Both 6+ x 4½+, pkt. of 10 — $4.00 net, with envelopes. Sask. residents add 20¢ tax.

1985 — ORCHID CALENDAR — 1985

Something new! A Wall Calendar containing a special collection of 13 full-colour photographs of Orchids by Murray Alcosser, 28 pp. 14" x 10", $10.95. SNHS members pay $9.85, Sask. SNHS members add 49¢ tax = $10.34.

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YOUR SOCIETY'S SPECIAL PUBLICATIONS

Why not include with your renewal an order for some of these publications for yourself or for others? While some titles are out of print, here's a list of those still available, their low prices due to grants, donations, etc.

Publication # 4	Blue Jay Index 1942-60 — Deutscher	$2.00	__	____
Publication # 6	Birds of Northeastern Saskatchewan — Nero	2.00	__	____
Publication # 7	Birds of Moose Mountain — Nero & Lein	2.00	__	____
Publication # 8	Blue Jay Index 1961-69 — O'Neil	3.00	__	____
Publication # 9	Birds of the Rosetown-Biggar District — Renaud & Renaud	4.00	__	____
Publication #11	Blue Jay Index 1970-78 — Bocking	5.00	__	____
Publication #12	Birds of Regina — Belcher	5.00	__	____
Publication #13	Birds of the Qu'Appelle — Callin	7.00	__	____
Publication #14	Saskatchewan Cougar - Elusive Cat — White Birds of the Elbow — Roy	.50	__	____
		Total		____

These publications can be ordered from the Blue Jay Bookshop, Box 1121, Regina, S4P 3B4, but please don't hesitate to send an order along with your membership renewal to Box 1784, Saskatoon, S7K 3S1.